CO-OPERATIVE LEARNING AND THE NEW PRIMARY SCIENCE CURRICULUM IN THE STATE OF QATAR

BY

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Abstract

The purpose of this study was to explore the feasibility and effectiveness of co-operative learning methods in science teaching in Qatari primary schools. Although co-operative learning methods have been researched for at least thirty years, these methods have up until now never been researched in Qatari primary schools in connection with any subject area.

Considering the aims of the study, it was necessary to use both qualitative and quantitative measures to pursue the investigation. The questionnaire technique was used to investigate pupils' and teachers' perceptions of co-operative learning, and an achievement test was used to determine the effect of co-operative learning methods on pupil achievement. On the other hand, diaries were used to gather information regarding teachers' perspectives on the training programme and on the implementation of co-operative learning in practice; focused interviews were conducted with teachers who participated in carrying out and implementing co-operative learning in schools; observations were used to gather information relating to pupils' and teachers' behaviour and interaction during co-operative learning sessions.

The study was carried out in three related stages. The first stage was concerned with administering a teachers' questionnaire to all male and female science teachers in Qatari primary schools. The second stage involved designing a training programme to promote co-operative learning and training a group of male science teachers to use co-operative learning in practice. The third stage was concerned with implementing co-operative learning in classrooms, and evaluating the outcomes in terms of the childrens' learning and their perceptions regarding co-operative learning.

The thesis maintains that teachers in Qatari primary schools were able to implement co-operative learning on a small scale in their classrooms. They agreed that co-operative learning accords to teachers more important roles than do traditional teaching methods. Moreover, they suggested that co-operative learning increases pupil participation and interaction, develops social skills and better relationships among pupils, and increases pupil achievement.

The findings of this study indicate also that pupils had a high degree of commitment to co-operative learning. They were able to share ideas and materials and help other pupils to learn. Moreover, they enjoyed working in groups, and contributed verbally in the groups to complete the assigned materials. Furthermore, the findings of the achievement test revealed that the treatment group outperformed the control group in the post-achievement test. Taking these things as a whole, pupils in Qatari primary schools responded positively to co-operative learning.

Present circumstances, however, present obstacles to the wholesale introduction of co-operative learning. These obstacles range from technical, administrative, behavioural and resource-related problems through to cultural obstacles which serve to hinder the use of co-operative learning in classrooms. Nevertheless, it is argued that progress can be made within the existing framework. Teachers can incorporate elements of co-

operative learning into their classrooms in order to increase pupil participation and interaction, improve achievement, and enhance relationships among pupils. In this context, a model has been developed as a possible means of incorporating elements of co-operative learning into the existing school framework.

It is hoped, then, that the findings and the implications of this study will contribute towards improving educational practice, especially teaching methods in Qatari primary schools.

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Dedication

To my parents, my beloved wife Hanaa, my children Ghadah and Mohammed, and all the members of my family.

Copyright

Declaration

This thesis results entirely from my own work and has not been previously offered in candidature for any other degree or diploma.

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Chapter 1

Introduction

1.1 Statement of the problem

Since we are living in a world that is changing both socially and technologically, education has a crucial part to play in nurturing generations of people capable of absorbing rapid change and contributing to the process of social development. Teachers play an important role in this complex education system, and they are facing challenging issues (Bellon *et al.,* 1992). According to Cohen and Manion (1993), teachers are not only expected to teach the curriculum, but also to foster positive attitudes, develop essential skills and reinforce cultural norms. Moreover, they are also asked to attend to their students' psychological and social problems. There is evidence that teaching is becoming more difficult and stressful (Dunham, 1992). Therefore, teachers need reliable methods and resources to help them cope with current curriculum development and teach more effectively.

In Qatar, teachers at the primary stage mainly employ traditional teaching approaches. Kamal (1990) points out that teaching methods are not keeping pace with social change:

> A major problem for Qatari society is the effect of modernisation. Everything is changing and so the teachers must change too. The traditional method of teaching used does not correspond to the present needs of the students. (p. 55)

El-Koussy (1967) points out that learning in the Arab world means listening to lectures, looking at blackboards, and memorising passages so as to reproduce them in examinations. This type of teaching converts the role of teachers from one which focuses upon the whole pupil – socially, cognitively and emotionally – into one which focuses solely on cognitive learning. Moreover, it fails to deal adequately with differences in potential among students (Massialas and Jarrar, 1983). Teachers take much of the blame for the existing situation; however, the system itself and society as a whole must bear some portion of the responsibility (Kamal, 1990).

In Qatar, there appears to be a lack of suitable training to improve the skills needed to implement new strategies of instruction. Teachers need suitable resources if they are to implement new teaching methodologies. In an effort to unify curricula in all the Gulf States for all subjects and stages, the Gulf Arab Education Bureau has developed new curricula for all subjects in the primary stage. These curricula, particularly science, require different teaching methodologies. There is therefore a need for a study which will help to improve educational practice in Qatari schools, and the first step in this direction is to introduce new techniques and train teachers to implement them. It is in this context that the present study attempts to answer the question: can co-operative learning help teachers improve science teaching in Qatari primary schools?

Co-operative learning can be defined as a set of techniques for structuring the classroom environment that facilitate collaborative efforts among pupils. The pupils work together in small groups, and their efforts are directed towards academically beneficial as well as socially beneficial goals (Sharan *et al.*, 1980). Co-operative

learning is, of course, just one of a number of groupwork structures which teachers in the classroom may decide upon as being most appropriate for a given task. Numerous studies have illustrated the academic and practical benefits of a variety of co-operative learning techniques. Co-operative learning has been found to elevate levels of student achievement, providing the greatest gains for low and middle achievers, minority groups and handicapped students (Johnson and Johnson, 1987; Johnson *et al.*, 1985; Slavin, 1984a; Slavin and Oickle, 1981). Moreover, students who have worked co-operatively demonstrate more positive attitudes and behaviours than control groups who have worked otherwise (Slavin, *et al.*, 1984). Co-operative learning has the potential to transform our schools, our communities and, ultimately, our society (Slavin, 1989–90).

In Britain, the use of classroom grouping has received some attention from educators and researchers such as the authors of the Plowden Report (CACE, 1967) and Galton *et al.* (1980). The Plowden Report (CACE, 1967) on primary education in England and Wales suggested that groupwork would help pupils interrelate with each other, help them to learn from each other, and increase their motivation to learn. Some recent studies in the Middle East have also suggested that co-operative learning is an effective method for increasing pupils' achievement (Nouh, 1993; Qa'ud, 1995).

For co-operative learning to be successful in Qatari schools, full support from students, teachers, school administrators and the education system is essential. However, if one of these four parties, especially teachers, who are used to the more traditional approaches, does not collaborate, co-operative learning cannot be expected

to produce the desired outcomes. It is to be hoped that the Qatari education system will enable a fair assessment of co-operative learning to be undertaken.

1.2 The purpose of the study

The purpose of the present study is to investigate teachers' perceptions regarding the use of co-operative learning. It will also investigate pupils' perceptions regarding the experience of co-operative learning, and examine the achievement of pupils before and after experiencing co-operative learning.

1.3 Research questions

The following questions were addressed in the research:

1. Is co-operative learning a suitable teaching method for science teachers in Qatari primary schools?
2. Are there any cultural or practical problems in implementing co-operative learning in Qatari primary schools?
3. Can teachers in Qatar be trained in the co-operative learning techniques?
4. Does co-operative learning have a differential impact upon the achievement levels of pupils with high, average, and low prior knowledge?
5. Can teachers in Qatar successfully implement co-operative learning in practice?
6. Can there be found among primary school pupils in Qatar positive perceptions of the experience of co-operative learning?
7. Can there be found among primary school science teachers in Qatar positive perceptions of co-operative learning?
8. What is the effect on pupils' achievement of using co-operative learning methods against existing teaching methods?

1.4 Limitations of the study

This study is limited in the following ways:

1. For religious and traditional reasons, the subjects of the sample were all boys. Islamic belief requires separate schools for boys and girls, with male teachers for boys and female teachers for girls. Males are not allowed to have any direct interaction with girls' schools.

2. The sample is limited to students in the sixth grade.

3. The findings are limited to the teaching of science in primary schools.

1.5 The significance of the study

In Qatar, the most common teaching method is delivery of information, along with a focus on memorisation. Teachers are regarded as the main source of knowledge, and textbooks and blackboard are the only means of illustration (Al-Sada, 1992). Teachers admit that they use traditional teaching methods which are largely unacceptable in terms of benefiting the whole individual. Their justification has been that the syllabus is too extensive, and the subjects too numerous (Bawazeer, 1979).

Due to the increasing importance of the role of science in the life of humankind, science teaching and learning have undergone rapid changes in structure, content, methods and means to cope with the rapid course of modern life. The Department of Curricula and Textbooks, together with the Gulf Arab Education Bureau, has developed the new science curriculum to cope with the changing world and to satisfy students' interests, needs and inclinations. This new curriculum requires new approaches to teaching, which focus on promoting critical thinking and problem-

solving skills, while involving both teachers and students in the learning process. The traditional approaches cannot effectively respond to new curriculum requirements.

Teachers are busy as practitioners and need suitable resources to keep them aware of and informed about new and effective teaching techniques. This study will be valuable in helping to determine the value of co-operative learning as a pedagogical strategy. The study will provide data which teachers can use in evaluating the effectiveness of co-operative learning. A body of research literature on co-operative learning techniques in primary and secondary schools has developed since the early 1970s, although only recently have such techniques gained popularity. Before teachers will consider using or implementing co-operative learning techniques, just as with any other new method of teaching they will tend to ask how this will affect achievement and behaviour in their classrooms. Achievement and classroom management are among the greatest concerns of teachers today. Therefore research is needed to investigate the effects of co-operative learning in relation to achievement and the perceptions of both teachers and pupils in primary school science classes. This study will add to the body of research in this area, where information is currently lacking.

1.6 The organisation of the study

The study is organised as follows:

Chapter 2 outlines the cultural context of the problem, including the geographical and social dimensions of Qatar, characteristics of and problems associated with education in Qatar, and, finally, the relative influence of Islam and Arabic culture on the school system.

Chapter 3 introduces the subject of science education in Qatar, including models for developing curricula, the development of science curricula in Qatar, and teaching methods in Qatari schools, with special reference to science teaching in Qatar.

Chapter 4 provides a comprehensive review of the related literature on co-operative learning.

Chapter 5 discusses the essential conditions for and the cultural orientation of co-operative learning.

Chapter 6 describes the procedures and methodology employed in gathering and analysing data.

Chapter 7 presents and analyses the teachers questionnaire results.

Chapter 8 evaluates the training programme for co-operative learning.

Chapter 9 evaluates the implementation of the experimental programme.

Chapter 10 presents and analyses the pupils questionnaires, observation of pupils and achievement tests.

Chapter 11 discusses the findings of the present study in relation to those of previous studies.

Chapter 12 provides a summary, conclusion and recommendations.

The appendices present materials, tests, and instruments used in the study.

Chapter 2

The Cultural Context of the Problem

2.1 Introduction

In order to establish the general context for this study, it is important to highlight the geographical and social background of Qatar, with special reference to the characteristics and problems of education, because education does not exist in a vacuum. The educational system cannot be understood outside the overall context of the society. Therefore, an understanding of the background of Qatar is essential to identify the factors which have influenced, and are still affecting, education in Qatar.

2.2 The state of Qatar

The state of Qatar is a peninsula, surrounded by several small islands, situated half-way along the western coast of the Arabian Gulf bordered by the Kingdom of Saudi Arabia to the south-west, the United Arab Emirates to the south-east and the state of Bahrain to the west. The total area of the country is 11,400km² (4,000 square miles), including a number of dependent islands (State of Qatar Annual Statistical Abstract, 1992). The population of the state of Qatar is 369,079 as given in the March 1986 Census.

Most of Qatar is flat save for a small range of low hills in the north-west of the country. High hills do not exist across the Qatar peninsula, and the surface of the ground is marked only by some sandy and salty dunes that are scattered along the peninsula.

Qatar has a hot summer which lasts from the beginning of June until the end of August. Winter is generally warm but short. It extends from December until the end of February. March, April, May, October and November are generally more moderate.

Qatar was governed under treaty with Britain until 1971, when it obtained full independence. At present it is ruled by the Al-Thani family, who came to Qatar from Saudi Arabia in the eighteenth century.

The capital of the country is Doha, which is inhabited by 309,290 people, who account for 83 per cent of the total population. It is the largest city in Qatar and the locus of all important government offices and ministries, as well as private companies.

Besides the capital, Qatar has several other important towns and cities. Dukhan, a relatively new town, was constructed on the western coast of Qatar after the discovery of oil at the end of 1939. Umm Said, on the east coast, is an industrial town known for its refinery, from which oil is exported to the world. The third major town is al-Wakra, an old town on the eastern coast of Qatar half-way between Doha and Umm Said. It used to be a centre for pearl commerce and fishing. The fourth major town is al-Khawr, a traditional town to the north of Qatar, famous for fishing. Finally there is al-Shamal, a modern city in which several tribes from northern Qatar have gathered together and settled.

The social circumstances of Qatar are similar to those of the Gulf region as a whole. Melikan (1981) points out that culture in Qatar follows regulations and laws derived from Islamic beliefs, traditions and codes of behaviour. He goes on to say that it is a culture in which religion, extended families and traditions are powerful and have an impact on both institutions and social life generally. The Qatari family is basically made up of interrelated tribes. The conventions regulating relations among the members of Qatari society are by tradition constant and binding. These are reflected in

the values and habits of the society (Hamed, 1993). Melikan (1981) holds that Qatari culture does not encourage individuality, creativity and innovation.

2.3 Characteristics of and problems associated with education in Qatar

It is necessary at this point to provide a brief overview of the Qatari education system. This will serve as an introduction to the section on the problems of education in Qatar. Systematic education in the real sense began in Qatar in 1956–7:

> In 1958 and as a result of a decision taken by the Cultural Department of the Arab League which was initiated in the same year, elementary, preparatory, and secondary stages were considered to be the main formal stages in public schools in Arab countries. The state of Qatar as a member of this league abided by this decision. (Ministry of Education Report, March 1985, p. 23)

The present structure of the Qatari education system is as follows:

1. General education, which comprises three stages: six years primary (6-12 years), three years preparatory (13-15 years), three years secondary (16-18 years).
2. Technical (secondary stage).
3. Commercial (secondary stage).
4. Religious: preparatory and secondary stages.
5. Functional rehabilitation institutes:
   (a) Languages Institute (for non-Arabic speakers);
   (b) Administration Institute (two-year course).
6. Higher education. This started in 1973 with the establishment of two faculties of education, for men and women. In 1977, Qatar University was officially opened, comprising four faculties: Islamic Law and Islamic Studies; Education; Humanitarian Sciences; and General Science. In 1980–1 the Faculty of Engineering was established, and, in 1985, the Faculty of Administration.

The school system in Qatar is centralised. The power of decision-making, appointment, promotion and dismissal of staff, curriculum development, textbook production and instruction on school routines and policies is in the hands of the

Ministry of Education (Al-Jalal, 1984). Under such a system, teachers do not play any part in any of the educational decisions relating to curriculum development, teaching methods, time allocated to teaching particular subjects, etc. (Abu-Galalah, 1993). Moreover, teachers are required to execute the orders of the Central Office in covering the assigned syllabus, regardless of outcome (Al-Hafidh, 1973). A UNESCO expert who studied the Qatari educational system reported as follows:

> Education in Qatar, as in most of the Arab States especially in the Gulf area, is almost completely centralised. Policies, curricula, textbooks, plans for expansion, examinations, all emanate from the central office and the teachers exercise no influence on the shaping of education and policy. Their job is to see that those subordinate to them apply them literally. (Al-Hafidh, 1973)

In Qatar, educational administration is characterised by a lack of expertise in coping with recent trends in education, by technological literacy, and by centralisation in financing and developing policies (Ghannam, 1984). Kamal (1990) makes the point that

> despite the fact that education is rapidly expanding, accompanied by considerable growth in administration, the administration system in general and the social, economic and political conditions have failed to develop in Qatar. This problem has not been resolved. (p. 19)

Parker (1985) believes that administrators should provide support while teachers implement new teaching techniques. Innovation is more likely to be successful in schools where administrators adopt an active role in understanding and implementing ideas during in-service training. Doran (1980) suggests that, despite the fact that teachers need help in applying the new knowledge and skills they have gained during in-service training, they are most often left to work in isolation from other adults. In addition, Parker (1985) argues that during the period when teachers are implementing newly-learnt techniques, school principals should provide a safe and supportive environment for them to try out and become skilled in new techniques. Tibawi (1972) points out that the reasons for the lack of innovation by teachers in schools must be sought in the system itself, its own methods of administrative control and their application in the schools. In addition, any change or development in schools needs

administrative support, otherwise it will fail from the outset. For example, introducing new teaching techniques such as co-operative learning requires comprehensive support from different levels, one of which is the level of administration. According to Ellis (1989–90), in schools where principals take an active role in promoting the use of co-operative learning, more teachers have acquired the strategy, and more now use it regularly.

The Ministry controls all primary schools and all educational policies. At school level principals are the cornerstone of educational administration. However, the Ministry is remote from the schools, and educational administrators at school level (i.e. principals) may resist change.

2.3.1 The teaching profession in Qatar

In the last decade, Qatar has achieved a noticeable increase in the number of students at all levels (Table 2.1). This has been accompanied by an increase in the total number of teachers in public education from 1,374 in the academic year 1972–3 to 6,185 in 1992–3 (Ministry of Education, Annual Report, 1992–3). The modern education system in Qatar is characterised by a lack of Qatari teachers, especially male teachers in the secondary stage (Kamal, 1990). The teaching force consists extensively of teachers recruited from neighbouring Arab countries. Table 2.2 shows the distribution of the teaching force in public schools by nationality and gender. The increasing numbers of the non-Qatari workforce have had a great impact on the social life of the country (Al-Hamadi, 1984). Furthermore, they have ultimately had an impact on the process of curriculum development. In this context, Al-Ibrahim (1980) states that no unique Qatari education system can emerge until the system in Qatar pays attention to the professional development of Qatari teachers, and these teachers should be involved in the processes of any educational development and innovation. Moreover,

Al-Hamadi (1984) points out that teachers from other countries have difficulty understanding the Qatari culture and communicating with the community.

Table 2.1 Number of students, teachers and schools in the public school system

Academic year	Number of students		Number of teachers		Number of schools	
	M	F	M	F	M	F
1951–2	204	–	6	–	1	–
1955–6	1,000	50	45	1	15	1
1960–1	4,023	1,942	359	135	40	20
1970–1	10,704	7,827	626	447	47	38
1980–1	20,588	19,356	1,606	1,882	71	70
1986–7	27,522	26,657	2,483	2,782	80	81
1989–90	31,300	30,614	2,470	3,845	80	111
1991–2	30,443	30,039	2,453	4,469	97	97

Source: Ministry of Education, 1991–2.

Table 2.2 Distribution of school staff in Government schools by nationality, sex and teaching level

Teaching level	Qataris		Non-Qataris		Total	
	M	F	M	F	M	F
Primary stage	282	2,492	760	160	1,042	2,652
Preparatory stage	113	789	679	189	792	977
Secondary stage	54	553	565	287	619	840
Total (including administrative personnel)	449	3,834	2,004	635	2,453	4,469

Source: Ministry of Education, 1991–2.

Studies have been undertaken to ascertain the reasons for the shortage of Qatari teachers in school (Al-Hamadi, 1984; Al-Jalal, 1984). Al-Jalal (1984) indicates several reasons, such as underpopulation; an over-cautious education system, which is still in its infancy; rapidly increasing wealth, which has changed the socio-economic structure of the society; and, finally, the failure of the education system to promote the development of society. Al-Hamadi (1984) adds that the low social status of teachers and their meagre personal advantages are among the reasons for the problem.

Another problem facing the teaching profession in Qatar is identified by Al-Atari (1989), who points out that Qatari teachers often enter the profession with relatively

little experience and preparation. Therefore complaints from new teachers are common, especially in the first year. Al-Atari goes on to say that large numbers of primary school teachers are not well qualified, because high-school diplomas are the only qualification that they have. They are extremely ill prepared to assume all the responsibilities expected of them. Hayon and Beretz (1986) claim that when beginning teachers experience the real world of teaching, they are shocked by the harsh and rude reality of everyday classroom life. From these studies it can be argued that teachers need to be retrained if they are to participate in any educational development or implement any new teaching techniques. The present study will take these points into account when the subject of a new teaching methodology is introduced.

2.3.2 Teacher training

The University of Qatar is the only organisation in Qatar which offers higher degree studies and teacher training programmes. It provides 2–4 years of pre-service preparation for teachers, the aim of which is to develop the foundations for professional service and provide some practical experience. However, studies which have examined the teacher training programme in Qatar have made a number of criticisms. For example, Hajaj and Al-Sheikh (1984) investigated various factors influencing teacher training programmes at the University of Qatar. The faculty members, teachers and student teachers were included in the sample. One of these factors was the relationship between academic courses of study and present school practice. Hajaj and Al-Sheikh found that such a relationship essentially did not exist. Their study offered two reasons for such a situation: (1) lack of communication between the Faculty of Education and practitioners in schools; (2) the Faculty of Education emphasising theory rather than application or practice.

Hajaj and Al-Sheikh also investigated the adequacy of credit hours offered at the Faculty of Education. All three categories (staff members, school teachers and student

teachers) agreed in identifying several factors which may be considered responsible for the current state of teacher-training for graduates on major courses. These factors were as follows: deficiency of evaluation processes; inadequacy of credit hour offerings in major courses; the enrolment of students in education against their wishes; over-emphasis on theoretical aspects rather than on application; and the increasing credit hours in education and psychology courses at the expense of major course credit hours.

Further, the study pointed out the most important reasons for the lack of success of the teacher training programme as being: lack of preliminary training for students before they embark on their teaching practice; insufficient time allocated to block teaching; discrepancy between teaching methods advocated by staff members and teaching practice supervisors; teaching practice supervisors placing emphasis on the operational aspects of teaching. It should be noted, however, that this study is twelve years old, and so further research is needed to examine these factors.

2.3.3 Teaching methods

Anderson and Burns (1989) offer a comprehensive definition of teaching, as follows:

> Teaching is an interpersonal, interactive activity, typically involving verbal communication, which is undertaken for the purpose of helping one or more students learn or change the ways in which they can or will behave. (p. 8)

This definition suggests that teaching is an intentional and interpersonal activity. However, there is no single teaching method which can be used all the time to satisfy all the learning domains (cognitive, affective and psychomotor). Reece and Walker (1994) argue that there are some important criteria which need to be considered when selecting teaching methods: for example, objectives to be achieved, group size, needs

and characteristics of pupils, and motivation of pupils. Moreover, they suggest that teachers:

> can use some strategies within other strategies, for instance using buzz groups within a lecture. As usual in education, there are few answers which are totally right or totally wrong. Some strategies appear to be more effective with certain students in certain situations. (p. 108)

However, in Qatari schools, most teachers use the didactic method all the time for teaching all subjects in their classrooms (Al-Sada, 1992; Kamal, 1990; Massiales and Jarrar, 1983). This method has been defined in the *Dictionary of Education* as follows:

> A lecture-based approach to teaching that is fairly rigid and that emphasises compliant behaviour on the part of the students while the teacher dispenses information. (Shafritz, 1988, p. 151)

Johnson and Johnson (1987) point out that teachers use different approaches in the structuring of classes. In every classroom, regardless of the age of students or subject matter, teachers may structure lessons so that students:

1. Work collaboratively in small groups, ensuring that all members master the assigned material ...
2. Engage in a win–lose struggle to see who is the best ...
3. Work independently on their own learning goals and at their own pace and in their own space to achieve a preset criterion of excellence. (p. 1)

In Qatari schools, teachers very often structure lessons competitively so that students work against each other to achieve a goal that only one or a few students can attain. Pupils are graded on a curve, which requires them to work faster and more accurately than their classmates. Massialas and Jarrar (1983) point out that the content of curricula in the Arab world is quantity-oriented; teaching and learning become artificial, leading to rote memorisation which bores both students and teachers and which is soon forgotten. The common practice is for teachers to lecture on a daily topic. Then, what little time remains is reserved for recitation of materials and for giving students a large amount of homework (Massialas and Jarrar, 1983). The emphasis on memorisation and lecturing is not unique to the Qatari education system,

but is linked to broader patterns of traditional and religious instruction in Islamic societies in the past. Tibawi (1972) described this phenomenon thus:

> The problem is rooted in Arabic and Islamic practice in the age of decadence when reliance on memory and learning by rote, adherence to existing texts and respect for authoritative opinion became established at lower or higher levels of education. Once the original Arab oral tradition was superseded by fixed written material, the teacher's function became more of a restrained transmitter and commentator and less of a resourceful adapter and innovator. (p. 211)

Al-Makkari (Nakosteen, 1964) describes the most common method of instruction in medieval Islam, pointing out that the formal delivery of lectures, with students seated before the lecturer, was the prevailing method of instruction. The teacher read from prepared materials, explaining the content of the materials, and allowed questions and discussion to follow the lecture. Students took complete notes for each lecture, on account of a lack of texts and printing facilities at that time. Islamic education placed special emphasis on memory and considered it as the criterion of mastery. Goitein (1971) maintains that memorisation played a critical role in the process of mastering any of the Islamic sciences. Moreover, Al-Sakhawi points out that learners memorised their texts by means of a comprehensive training that stressed the role of memory; memorising four or five hundred manuscript lines per day was considered a noteworthy achievement (Berkey, 1992). Exploration of knowledge, new teaching methods, theories of psychology and technology availed little to change the existing practice in the Muslim world. Therefore, in 1966, a conference of Arab teachers was held in Alexandria at which a paper contributed by the Secretary General of the Egyptian Ministry of Education was read. It contained the following statement:

> It is noteworthy that despite the development of the subject matter of the syllabuses, their outstanding trends are still theoretical, and that despite the teachers' efforts to develop new teaching methods, the general work of existing methods is still dictation and delivery. This is, of course, contrary to the call for giving prominence to the practical and applied aspects of the prescribed syllabus, and for stressing the functional sides in the syllabus and their relation to man's social environment. Indeed, it is contrary to the repeated recommendations by educationists that pupils should participate in the process of learning, use their hands and carry out experiments, and that teaching methods should accord with this technological age by the employment of visual and aural aids in teaching. But these calls and recommendations failed to evoke genuine response from the majority of teachers, and the scholastic work still goes on in its old ways. (Tibawi, 1972, p. 212)

Husain and Ashraf (1979) maintain that the traditional patterns of teaching methods in the Muslim world run deep, and where traditional Islamic education has survived in the modern world, memorisation of texts remains one of its central features. In this context, it seems that existing teaching methods in Qatar are actually rooted in Islamic and Arabic culture. Tibawi (1972) indicates that prior to the modern education system, the only formal and traditional education in the Muslim world, as well as in the Gulf region, was Kuttab education. This was religiously-oriented education, involving the teaching of the Koran, writing and reading. The teaching methods at the Kuttab focused on rote memorisation and were extremely simple and primitive (Al-Kobisi, 1979; Al-Nuri, 1950). Although the education system in Qatar has witnessed great improvement in various areas, traditional teaching methods remain, with little emphasis on change.

Bawazeer (1979) points out that teachers are concerned with preparing students for passing examinations, and emphasises the importance of memorisation in achieving this. He goes on to say that, as a result of these methods of teaching, teachers become conveyors of information rather than facilitators of learning. He adds that, in this type of environment, students tend to seek the teacher's approval rather than participate in discussion concerning evidence, findings and rationales. Moreover, Massiales and Jarrar (1983) indicate that students' participation in the classroom is very limited, and occurs only when they are asked to recite passages from the textbook or to answer questions. Students are seated in rows in overcrowded rooms, a physical arrangement which does not encourage face-to-face interaction.

2.4 The influence of religion on Qatari society and the Qatari education system

Islam is the country's official religion and Islamic jurisprudence, the Sharia, is recognised as the basis of the legal system (Ministry of Education, 1992–3). Koranic learning and adherence to the Islamic faith are values that are held in high esteem. The

religious leaders have a strong influence on the educational, legislative and judicial systems (Al-Atari, 1989, pp. 187–8).

Attempting to define Islamic education, Husain and Ashraf (1979) describe it as:

> an education which trains the sensibility of pupils in such a manner that in their attitude to life, their actions, decisions and approach to all kinds of knowledge, they are governed by the spiritual and deeply felt ethical values of Islam. They are trained, and mentally so disciplined, that they want to acquire knowledge not merely to satisfy an intellectual curiosity or just for material worldly benefit, but to develop as rational, righteous beings and bring about the spiritual, moral and physical welfare of their families, their people and mankind. (p. 1)

The attitude of Islam towards knowledge is clearly stated in the Koran and the Hadith. For example, in the Koran God said: 'Whosoever has been given knowledge has indeed been given abundant good' (Ali, 1938, 2:269). Moreover, God said: 'Only those people will be promoted to suitable ranks and degrees who have faith and who are possessed of knowledge' (28:11). He also said: 'Say, are those who possess knowledge and who do not possess knowledge on an equal footing?' (23: 9). In the Hadith the Prophet said: 'A person who follows a path for acquiring knowledge, Allah, will make easy the passage for [to] Paradise for him' (An-nawawi, 1989, 241:1,381). He also said: 'A person who goes (out of his house) in search of knowledge, he is in Allah's way and he remains so till he returns' (241:1,385).

Although Arab nations share a common history, religion, language and interests, there are ideological conflicts which clearly reflect the inability of the Arab world to unite in their educational policies around common values. Kadri (1986) points out that there are as many educational policies in Arab schools as there are political ideologies. As a result, he argues, whether it be the result of deliberate planning or of historical drift and inertia, the content of education is determined by what people have thought to be the aim of education, and such aims can never be socially or politically neutral. One country, therefore, may emphasise aspects of tradition in the curriculum, another modern technology, a third the humanities, and yet another historical materialism

(Kadri, 1986). In this way, each country aims to realise its national goals. Szyliowicz (1973) writes that:

> adaptive systems tend to emphasise religious instruction to a far greater degree than the radical regimes, and accord a sizeable proportion of the primary school curriculum to religious education. Overall, the average is 12%; however in Saudi Arabia, 36% of the primary school curriculum is taken up with this subject as compared to 2% in Algeria and 11% in Egypt. (p. 52)

Unfortunately, no conclusions can be drawn from these figures. There is great interaction between Islamic culture and Arabic culture in all aspects, especially in the Gulf States. Tibawi (1972) elaborates on this point:

> Every educational system is caught between conflicting pressures, such as respect for tradition and necessity for change. Partly on this account and partly because of the complexity of the process of education, every system is liable to fall short of its objectives. (p. 223)

He specifies that in the Arab world there is:

> a desire to link the present with the Islamic past, or at least to assert the Islamic values. (p. 223)

In the case of Qatar, the link between culture and Islam can be seen in various areas. However, it is not always easy to distinguish whether the system is following Islamic culture or Arab culture. For example, the education system of Qatar is not geared towards coeducation. There are separate schools for boys and girls, with male teachers for boys, particularly at the preparatory and secondary stages, and female teachers for girls at all stages. However, at university level, male instructors do teach female students and female instructors do teach male students in almost all fields and courses. Moreover, at the administrative level, employees are to some extent mixed. From this example, it can be argued that if religious beliefs require separate schools for boys and girls, this should be applied at all levels and in all areas. There is, therefore, confusion between what is Islamic culture and what is Arab culture. Another example of this is the position of women in Gulf society, as described by Al-Misnad (1984):

> Although the treatment of women is influenced by laws set down by Islam, the equality of the sexes was never realised in tribal and traditional practices, particularly in the case of Gulf society which remains almost untouched by Western influence until the 20th century. Men and women continued to live by their tribal and traditional customs until

> the mid-20th century. However, with oil wealth and modernisation which brought economic and social changes, the tribal and traditional customs have of necessity begun to break down. (p. 37)

From the above example, it seems that tradition sometimes has greater influence on society than religion. However, it seems that no clear-cut demarcation can be made between what is religious and what is not.

Ideally, the Qatari education system is a response to Islamic belief, faith and instruction. The influence of Islam can be seen in various areas, from the general principles and objectives for all stages of education, the structure of the education system, the development of curricula, the types of education and the school buildings, to the activities in schools. These components are all discussed in the Ministry of Education Report (Ministry of Education, 1991-2), and will be discussed in turns.

2.4.1 General principles of education in Qatar

The following statements summarised from the report indicate the general principles of education in Qatar:

(a) *Deep-rooting religious education.* This is achieved by inculcating in the younger generation a true belief in Allah, the Sole Creator. This develops the young's sense of piety and inculcates Islamic values and concepts in their minds to prevail over their behaviour and future life-practices.

(b) *Developing a sense of affiliation and loyalty.* This is accomplished by developing deep-rooted affiliation to homeland, then to region, and then to the whole Arab nation. It has also been realised that a sense of pride in their religion and the legacy of their nation, with all its depth, genuineness and cultural loftiness, can be engendered in the minds of the new generation. This can be achieved by presenting the contributions of Muslims in all fields of science and knowledge, and by emphasising the pioneering role and contributions of Islamic civilisation in building contemporary human civilisation. These are ideals which, however, appear not so far to have been achieved.

It is evident from the above that religious education is one of the priorities for the education system in Qatar. Educational objectives at every stage are expected to emphasise religious education because they are derived from the general principles of education.

2.4.2 General objectives of education in Qatar

The following statements are among the general objectives of education in Qatar as they appear in the report (Ministry of Education, 1991–2):

1. Building up a comprehensive personality aware of its national and human role and adhering – in its individual or collective conduct – to the sublime Islamic and Arab ideals.

2. Achievement of the cohesiveness of Arab Islamic society through deep-rooted unity of thought, action and destiny.

3. Developing the proper affiliations of the Qatari citizen, namely affiliation to Qatar, the Gulf, Arabism, Islam and humanity at large.

4. Preservation of the Arab-Islamic personality of Qatari society, its genuine traditions and the intellectual and cultural Arab and Islamic heritage.

5. Opening up to the world, with its technological and scientific innovation, in order to incorporate those elements of progress and modernity that accord with the Arab-Islamic social pattern of society.

6. Fostering and promoting educational and cultural relations between Qatar and the Arab and Islamic countries, on the one hand, and the other countries of the world, and the international and regional organisations working for humanity, on the other.

2.4.2.1 Objectives for the primary stage

The first two objectives for the primary stage are stated in the Ministry of Education report (1991–2) as follows:

1. To provide the minimum education required by youngsters through furthering their religious studies and providing other types of basic human and scientific knowledge.

2. To prepare students to live in an Islamic society open to the world, from which they take and to which they give as citizens.

2.4.2.2 Objectives for the secondary stage

These aim to help students formulate a rational philosophy based upon genuine Islamic and Arab values. Furthermore, there is evidence that the deep-rooting and promoting of religious concepts and instructions were taken into account when curricula for all subjects and all stages were developed. For example, the following objectives are among the overall objectives of science teaching at primary stage in the Arabian Gulf States, including Qatar:

1. To assist learners in deepening Islam for themselves, in strengthening their belief in Allah Almighty and promoting a positive orientation towards Islam and its values.

2. To assist learners in becoming knowledgeable about the achievements of their Arab and Muslim forefathers, in respect of appreciating their achievement and following in their steps.

2.4.3 Islamic influence on course content

In addition, the Arab and Islamic inheritances were taken into account in the selection and organisation of the science curriculum at primary stage. The authors of the fifth-grade science textbook (1990) argue that:

> the content of the science course of instruction should include some aspects of the Arabic and Islamic (legacy of) inheritance in general and that of the Arabian Gulf in particular. The latter is presented in the study of subjects such as fishing, ships, fishermen and their fishing equipment, in addition to the contributions of the Arab and Moslem scientist in all scientific fields, whenever that is possible and appropriate. (Abu-Huwage, 1990, p. 17)

2.4.4 Coeducation

Qatar's education system is not geared towards coeducation. Religious beliefs require separate schools for boys and girls, with male teachers for boys, particularly at the preparatory and secondary stages, and female teachers for girls at all stages. Girls'

schools also have their own administration and supervision. Relationships with boys' education are monitored through the Girls' Education Guidance Department. All educational services and facilities for girls are provided via this channel. By the year 1983–4, the Girls' Education Department had been established, comprising three units:

- primary education
- preparatory education
- secondary education

This department is at present managed by the Assistant Under-Secretary for Educational Affairs.

2.4.5 Types of education in Qatar

Various types of education are provided by the education system in Qatar, religious education among them. Religious education starts from preparatory stage and above. This type of education is mainly concerned with Islamic and Arabic disciplinés. However, all other subjects are covered as well. Table 2.3 shows the weekly study plan for the Religious Institute in Doha which, it should be said, is not characteristic of that applying in the state schools. Roughly one half of the study periods are reserved for religion and Arabic, and the other half are for the other subjects. A smaller number of hours are allocated to science at the preparatory stage than are allocated to English and Mathematics.

Table 2.3 The Religious Institute: the weekly study plan

	Preparatory stage				Secondary stage			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th
					Lit.	Sce	Lit.	Sce
Religious Studies	11	11	11	8	11	8	13	8
Koran	3	3	3	2	3	2	3	2
Oneness (Tawheed)	1	1	1	–	1	1	2	1
Jurisprudence	4	4	4	3	4	3	5	3
Prophet Sayings (Hadith)	2	2	2	2	2	1	2	1
Islamic Subjects	–	–	–	1	1	1	1	1
Prophet Life (Sire)	1	1	1	–	–	–	–	–

Table 2.3 (cont.)

	Preparatory stage				Secondary stage			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th
					Lit.	Sce	Lit.	Sce
Arabic Language	10	10	10	8	10	7	10	7
Grammar	4	5	5	3	4	2	4	2
Reading, Composition, Dictation and Handwriting	6	5	5	–	–	–	–	–
Composition	–	–	–	1	1	1	1	1
Literature	–	–	–	2	3	2	3	2
Reading	–	–	–	2	2	2	2	2
English	6	5	5	6	8	6	7	6
Maths	4	5	5	5	–	8	–	8
Science	3	3	3	6	–	9	–	9
Physics	–	–	–	2	–	3	–	3
Chemistry	–	–	–	2	–	3	–	3
Biology	–	–	–	2	–	3	–	3
Sociology	3	3	3	5	9	–	8	–
History	–	–	–	2	3	–	3	–
Geography	–	–	–	2	3	–	2	–
Islamic Society	–	–	–	–	2	–	–	–
Sociology	–	–	–	1	–	–	–	–
Qatar Society	–	–	–	1	–	–	–	–
Philosophy and Psychology	–	–	–	–	–	–	3	–
P.E.	1	1	1	1	1	1	1	1
Art	1	1	1	–	–	–	–	–
Total	*39*	*39*	*39*	*51*	*47*	*48*	*47*	*48*

Source: *Ministry of Education*, 1991–2, p. 36.

2.4.6 School buildings

The Ministry of Education, in conjunction with UNESCO, has worked out designs for school buildings. The task of construction is undertaken by the School Buildings Department, which implements educational policy regarding school buildings on the following basis:

> It should conform with the geographic and cultural prerequisites of the environment, hence, the climatic conditions and the traditions of Qatari (Arab and Muslim) society should be taken into consideration. (Ministry of Education, 1992)

An appropriate place for performing prayer (a mosque) is an integral part of all schools in Qatar regardless of pupils' sex or stage. In addition, the Ministry of Education has allocated time for personnel, teachers and students to perform prayers every day. Students are encouraged and sometimes compelled to perform prayer at the

appropriate time. Finally, religious activities such as lectures, competitions and celebrations are very common in schools.

2.5 Issues emerging from the cultural context

It is evident from Table 2.3 that, although the Qatari education system has achieved a noticeable increase in the number of teachers at all levels during the last decade, there is still a real shortage of male teachers, especially at secondary level. Therefore new measures should be undertaken to encourage Qatari men to enter the teaching profession. Moreover, it has been claimed that large number of Qatari teachers, especially in primary schools, are not well qualified. They therefore cannot assume all the responsibilities they are expected to. In this context, if educational practice in Qatar is to be improved teachers should receive appropriate attention, because they are the heart of any educational reform.

Earlier in this chapter it was noted that, theoretically and on the level of principles and objectives, the Qatari education system is responding to Islamic belief, faith and instructions. However, in practice there is no evidence that its practitioners are assuming Islamic belief, faith and instruction as they are meant to do. For example, the position and influence of teachers in schools and in society are at present remote from the practice of Islamic societies in the past. The teacher in Islamic society is more than a mere functionary who has certain responsibilities to discharge. Husain and Ashraf (1979) describe the teacher as:

> a model to be emulated. He was expected to treat his charges not as so many sheep or cattle which needed to be herded or disciplined, but as impressionable human beings whose characters were to be moulded and who were to be initiated by him into the moral code which society cherished. For this reason, in Islam, the teacher was required not only to be a man of learning but also to be a person of virtue, a pious man whose conduct by itself could have an impact upon the minds of the young. It was not only what he taught that mattered; what he did, the way he conducted himself, his deportment in class and outside, were all expected to conform to an ideal which his pupils could unhesitatingly accept. (p. 104)

Unfortunately, this conception of teachers hardly exists in Qatari schools. As teachers come to be looked upon more and more as mere salaried persons, pupils lose their respect for those people who deserve to be emulated and on whom they could model themselves. On the other hand, teachers come to think that their responsibilities do not extend beyond what they do within the precinct of the school. Outside the classroom they are ordinary individuals without any special relationship with those whom they teach. Husain and Ashraf (1979) conclude that:

> quantitative changes in the size of schools or universities do render it difficult for close personal relationships between the teacher and the taught to grow. But the question which needs to be faced squarely is whether such large instructions are any good at all when the education they impart formally is negated by the deterioration in moral values, which results from the lack of personal bonds between the teacher and the taught. (p. 105)

The main questions to emerge from the above are these:

1. Are Islamic objectives and values practically translated into the content of all subject-matter, at all levels?

2. Are teachers and schools administrators assuming their responsibility for transferring Islamic values and principles to pupils?

3. Do curriculum planners and policy-makers have a clear vision regarding to what extent the school environment (buildings, curricula, teaching methods, classroom management) should be influenced by Islam?

All these fundamental questions remain unanswered. There is a need for careful study to attempt to answer the above questions. One of the main objectives of Chapter 3 is to examine the extent to which the primary school science curriculum is influenced by Islamic and Arabic cultures.

Chapter 3

The Development of Science Education in Qatar

3.1 Introduction

The cultural context of this study having now been discussed, this chapter introduces the subject of science education in Qatar, including models for developing curricula, the development of science curricula in Qatari schools, and teaching methods in Qatari schools, with special reference to science teaching in Qatar. The fifth-grade Teacher's Handbook (Abu-Huwage, 1990) and the sixth-grade Teacher's Handbook (Shiqeliya, 1992) are used as a primary source for discussing and analysing the development of the current science curriculum for the primary stage (SCPS).

3.2 Basic definitions of 'curriculum'

Before engaging in any discussion relating to science education in Qatar, it is of the utmost importance to define the context in which the term 'curriculum' is used in this chapter. Definitions of the term are both varied and broad. Some use the term in a very broad and general manner. Kerr (1968), for example, uses it to denote:

> all the learning which is planned and guided by the school whether it is carried on in groups or individually, inside or outside the school. (p. 16)

Other definitions imply very limited and specific contexts. Hirst (1968), for example, writes of:

> a programme of activities designed so that pupils will attain by learning certain specific ends or objectives. (p. 40)

Some educators, however, have attempted to bridge the gap between the broad and the narrow contexts. Skilbeck (1984), for example, defines the curriculum as referring to:

> the learning of students, in so far as they are expressed or anticipated in educational goals and objectives, plans and designs for learning and the implementation of these plans and designs in the school environment. (p. 21)

The curriculum can also be seen in terms of the goals of the students' learning. Tyler (1983) defines it as:

> all of the learning of students which is planned by and directed by school to attain its educational goals. (p. 73)

Krug (1957) offers a definition which emphasises the learner's experience rather than subject-matter, defining the curriculum as:

> all learning experience which children and youths have under the direction of the school. (p. 4)

Another definition, taking into account subject-matter, experience and objectives, is offered by Saylor, Alexander and Lowis (1980). They define the curriculum as:

> a plan for providing sets of learning opportunities to achieve broad goals and related specific objectives for an identifiable population served by a single school centre. (p. 6)

In general, the curriculum can be defined as being made up of (a) subject-matter (e.g. science, English), (b) learning objectives, (c) selection of content, (d) teaching methods, and (e) student assessment.

3.3 The development of curricula in Qatar

In Qatar, the development of the curriculum has gone through three major phases. The first phase was characterised by the importation of syllabuses for all subjects from other countries such as Egypt, Saudi Arabia and Kuwait. However, the adopted curricula have not responded to the needs of Qatari society, especially as regards

those subjects that deal with the geography and history of Qatar itself. Moreover, these curricula have been too confined to the above-mentioned countries, of which Qatari students knew nothing (Nagi, 1980). Therefore the Ministry of Education decided upon the gradual introduction of locally-written books, and this made up the second phase of curriculum development in Qatar. In 1965, committees were set up to produce Qatar's curricula. Individuals with experience, and who worked as teachers or inspectors in Qatari schools but were not Qatari, were assigned to produce the curricula. The project was criticised on the following grounds:

> Curriculum materials are developed and decided upon at the Ministry level and are distributed to the schools for mandatory use. No curriculum planning takes place at the school level. The process of curriculum development is therefore highly centralised, as are other educational planning functions. (Al-Ibrahim, 1980, p. 21)

Although Qatari citizens who are teachers are not asked to participate in curriculum planning, highly specialised and qualified teachers from other Arab countries do participate in the process. Many non-Qatari nationals, including professors from the University of Qatar, together with teachers and inspectors from the Ministry of Education, work to define goals and objectives before setting up curricula. This involvement of professionals from Arab countries has also been criticised, however, on the grounds that it:

> serves to continue the problem of borrowing curriculum development process, teaching practices, and concept of evaluation from sources outside. No unique Qatari school system can emerge until Qatari professionals are developed and external teachers and consultants are no longer necessary. (Al-Ibrahim, 1980, p. 31)

Moreover, in a survey investigating educational problems in the region, Al-Jalal (1986) identified several problems, most of which were related to the curriculum, school textbooks, teaching strategies and assessment systems. His study identified the following problems:

1. Repetition and redundancy of content in various syllabuses prescribed for the same level of education.

2. Giving too much content and information beyond pupils' learning capacity and giving unwarranted priority to the cognitive aspect in the course of study.

3. Ignoring creative productive activities in the curriculum, lack of activity orientation, and dissociation from demands made by practical life on the individual.

4. Dependence on material borrowed and translated from other cultures without revision or content-updating.

5. Curricula do not take account of the principle of individual differences and do not provide appropriate strategies for either the retarded or the gifted pupil. (p. 80)

3.4 Current curriculum development in Qatar

One of the recommendations made by the 1986 International Conference for Education (Ministry of Education, 1986) was that primary education in the Gulf States needed both universalisation and renovation. As regards renovation of primary education, efforts have been made in this direction in conjunction with the Arab Education Bureau of the Gulf States. Developing new standardised curricula for all the Gulf States was an integral part of the renovation process owing to several weaknesses which can be identified in the former curricula:

1. They emphasise the cognitive domain of learning while ignoring the affective and psychomotor domains. Al-Ahmad (1986) states that curriculum content emphasises the cognitive aspect while neglecting inclinations, interests, values and skills.

2. They have not responded to the needs of the Gulf States. Massialas and Jarrar (1983) indicate that the content of the textbooks bore little relation to regional needs. Moreover, Kamal (1990) points out that the content and activities provided in the textbooks were often irrelevant to the needs of a rapidly changing society.

3. They have not represented the culture and identity of the Gulf States. Al-Jalal (1986) maintains that dependence on materials imported from other cultures without revision and modification is one of the biggest problems facing education systems in the Gulf region.

4. They have not responded to the explosion of knowledge. Ornstein and Hunkins (1988) state that to cope with this knowledge explosion, as it shapes the future, curriculum planners and designers have two major questions to answer: (1) what knowledge to select; (2) how to organise it. They add that new knowledge must be continually introduced while less important knowledge and materials are pruned away.

For the above-mentioned reasons, and as a part of curriculum reform in the Gulf States, primary-stage curricula have been developed for a number of subjects, such as social studies, Arabic, mathematics and science. Although there are common cultural and social bases among countries in the Gulf States, there are also some differences. Each country is therefore given the right to change one third of the curriculum content to suit its own particular needs. The Ministry of Education in Qatar adopted the new standardised science curriculum for the primary stage during the academic year 1991–2.

3.5 The development of the science curriculum for the primary stage (SCPS)

The new science curriculum has gone through several phases, as follows:

1. The planning phase.
2. The design phase.
3. The development phase.
4. The pilot test phase.
5. The revision phase.
6. The reproduction phase.
7. The implementation phase.

In 1985, in order to implement the first three phases, two committees were formed. Each committee was made up of representatives from all the Gulf States. The first committee consists of the project's experts, who assumed responsibility for laying

down the philosophy and principles of the curriculum, its aims and objectives, the topics and concepts to be taught and the teaching methods, and for constructing evaluation forms. The second committee consisted of a writing team, who assumed responsibility for writing the content of the curriculum. During the academic year 1990–1, prior to the adopting of the curriculum, a pilot test was conducted. As a result, certain revisions were made according to the suggestions and recommendations made by the Ministries of Education in the Gulf States. In the year 1991–2, the curriculum was finally implemented.

3.6 Analysis of the SCPS

Curricula can be defined as being made up of four basic components: objectives; subject-matter; method and organisation; and evaluation (Giles *et al.*, 1942). This quadripartite design suggests that the components interact with each other; decisions made about one component are dependent on decisions made about the others. The relationship between the four is shown in Figure 3.1.

Although the SCPS contains these essential elements, they are not given equal weight. Subject-matter, objectives and assessment are given equal emphasis, while teaching methods are given less emphasis. This area will be discussed further as the analysis progresses. The next section will analyse the objectives, organisation of content, pedagogy and evaluation techniques of the SCPS in the Gulf States.

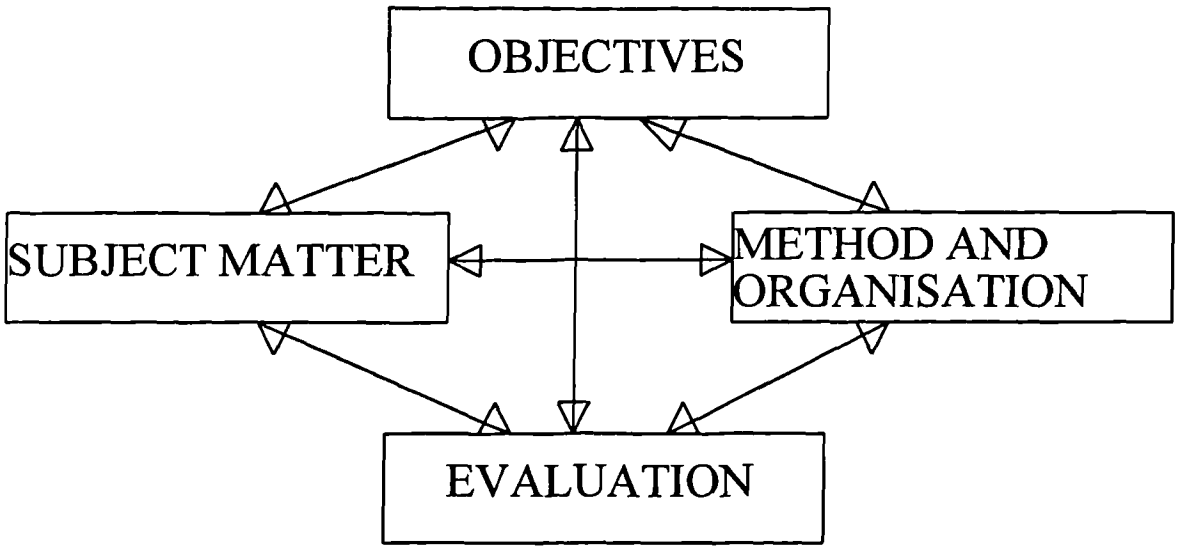


Figure 3.1 Four basic components of curriculum design (Source: Ornstein and Hunkins, 1988, p. 150)

3.6.1 The nature of science

It seems reasonable to begin a discussion of the nature of science with the question, what is science? This question may seem very simple, but the answer to it is very important from the point of view of better curriculum development. For example, in the science National Curriculum for England and Wales the nature of science is defined as follows:

> Science is a human endeavour and in its current study we need to acknowledge its history and future. It is a continuous process by which individuals and groups develop an understanding of the physical and biological aspects of the world. It is a way in which reliable knowledge about the world is progressively established through the generation and testing of ideas and theories. Faced with a new phenomenon, the scientist uses existing ideas which may then be modified or rejected if they do not help to explain it. The results of this scientific endeavour are progressively more powerful ways of understanding the physical and biological world. (DES, 1988, p. 6)

Ollerenshaw and Ritchie (1993) point out that science in the national curriculum is concerned with two things:

1. Investigative processes.
2. Current scientific theories.

This view of science has an important pedagogical implication, that is, children should explore and learn science through observing, explaining, predicting, reading, discussing, testing hypotheses, questioning, and planning further investigations (Ollerenshaw and Ritchie, 1993). In this way, children will develop scientific skills and systematic knowledge.

Ogawa (1986) argues that although the western understanding of science is the dominant one, it is not the only form of science in the world. He believes that every culture has its own science, has its own view of the world. For this reason, he argues that the term 'science' as it relates to school discipline should not be taken to mean 'western science', at least not in non-western society.

Islamic authors have attempted to provide an Islamic view of science (Gülen, 1993; Hofmann, 1993; Khalil, 1991). Gülen maintains that:

> science is the study of the nature and functioning of all things in the universe, of the harmony and principles governing their interactions. Science accumulates knowledge, in part through observation and classification, in part through explanation and experiment. (1993, p. 76)

Interestingly, it seems that there is no difference between the western understanding of science and the Islamic one. Khalil (1991) elaborates on this point. He stresses that Islamic science does not mean making new rules in mathematical or chemical equations, interfering with the laws of physics or biology or correcting atomic theory:

> Scientific activities ... are natural, whether they take place within a materialist, secular or spiritual context. Basically the Islamization of this kind of science knowledge is concerned with the attitudes and practices that are related to these activities, their relationship with the general trend of scientific and cultural activity, and [the] ethical framework within which their theoretical and practical results are applied. (p. 8)

Although the authors of the SCPS did not offer a clear definition or understanding of either science or science education, there is some evidence of their view on this in the overall objectives of the SCPS. Abu-Huwage (1990, p. 21) states that the overall objectives of the SCPS include the following:

1. Helping learners to understand themselves and the environment in which they live.
2. Providing learners with scientific interpretations of the natural phenomena which concern them.
3. Developing critical thinking and healthy habits in learners.
4. Deepening learners' Islamic faith and positive attitudes towards Islam, and helping them to appreciate the achievements and contributions in the field of science of their Arab and Muslim forefathers.

As can be seen from the above, the first three objectives are consistent with the western view of science, but the fourth objective is definitely not related to the components of western science. Rather, it is closely related to Arabic and Islamic culture. The authors seem to take the view that Islamic science is practised in a scientific spirit with scientific processes and methods, but governed by Islamic attitudes, values and ethics. This has been a primary objective of most curricula for schools at all levels since systematic education was established in Qatar in 1956. But the question which emerges here is whether teachers and educators in Qatar are working towards achieving this objective. Are they aware of their responsibility for achieving this objective?

The above suggests that the authors of the SCPS have their own view of science education, which may be different from that prevailing in the West. The SCPS

authors strongly link science with Arabic and Islamic culture in terms of attitudes and values, whereas in the West science is viewed as a means for the exporation of the physical world. The purpose of saying this is not to argue these respective views of science, but to highlight the different understandings of science which pertain in the Gulf States and in the West.

3.6.2 Objectives of the SCPS

In general, objectives regarding the curriculum can be defined as:

> statements that enable curriculum developers, teachers, and even students and members of the general public to identify the particular intent of a particular action. (Ornstein and Hunkins, 1988, p. 151)

McNeil (1990) indicates that these statements can have many purposes: they can provide general direction at a policy level, provide a framework for selecting and planning learning experiences, and set the criteria for assessing learners' performance. In the SCPS, all these objectives are recognised. For example, the Gulf Arab Bureau provides a list of eight general statements to function as a framework for the curriculum planners of all subject-matters for the primary stage in the Gulf states. The objectives of these statements are to assist learners:

1. In deepening their Islamic faith for themselves, strengthening their belief in Allah Almighty and promoting a positive orientation towards Islam and its values.

2. In acquiring facts and understanding practical concepts through practical activities.

3. In acquiring an appropriate orientation and appropriate habits through practical activities.

4. In developing interests and appropriate scientific inclinations through practical activities.

5. In developing an interest in science and in appreciating the efforts of scientists and the role they have played in the progress of science and humanity.

6. In becoming knowledgeable about the achievements of their Arab and Muslim forefathers, in respect of appreciating their achievements and following in their footsteps.

7. In acquiring and promoting appropriate rational skills through practical activities.

8. In acquiring appropriate practical and scientific skills through practical activities.

Interestingly, most of the above objectives stress consistently that pupils should acquire knowledge and skills through practical activities. This suggests that pupils are expected to engage in practical activities such as observation, investigation, testing, questioning and planning. However, Al-Sada (1992) claims that such activities hardly exist in Qatari classrooms. It should be noted that these objectives are imposed on the science curriculum planners by the Gulf Arab Bureau. They had to adopt these objectives and use them to reach consensus on direction at a policy level. Nevertheless, the authors of the SCPS seem to be satisfied with these objectives. Moreover, they outline their vision as to how science can contribute towards accomplishing the stated objectives (Abu–Huwage, 1990). For example, they explain the role which science can play in achieving the first objective. They stress that by studying parts of the universe and the creation, including living things (man, animals and plants), non-living things and the phenomena around us, learners can appreciate the greatness of the creator (God) and learn to feel gratitude towards God for his bounty. This will consequently help learners in deepening their Islamic faith for themselves and strengthening their belief in Allah.

As another example, the authors of the SCPS suggest that the science curriculum can contribute positively towards accomplishing the second stated objective (Abu-Huwage, 1990). They explain that scientific activities help pupils develop both the intellectual skills that allow them to explore the world of science and a fuller understanding of scientific phenomena and procedures of investigation. These activities aim to develop the ability of learners to:

- identify problems
- collect data related to the problem
- plan, hypothesise and predict
- test a hypothesis
- interpret results and findings
- draw inferences
- communicate to others the experimental procedures and conclusions

Apart from the general objectives, the authors of the SCPS generate more specific objectives for planning learning opportunities. These educational objectives appear at the beginning of each unit of the SCPS. They are meant to help teachers to understand the particular purpose of the unit and to assist them in generating their instructional objectives. For example, unit 1 in the sixth-grade science curriculum (man and environment) is divided into four chapters: the environment and its components; the relationship between the environmental components; environmental resources; and environmental pollution. The authors have provided educational objectives for each chapter (Abu-Huwage, 1990). To illustrate this, they state that unit 1 aims to help pupils to acquire the following:

I SCIENTIFIC FACTS AND CONCEPTS

Chapter 1 The environment and its components

1. The environment is the place which living organisms inhabit and in which they find their requirements for life, such as water, air and food.

2. The earth is a large environment which is composed of two principal types of environment: land and water.

3. There are many different land environments, such as the desert environment, the farm environment, the jungle environment and the Eskimo environment.

4. The water environment is also varied, with sea and river environments.

5. The environment is made up of:
   (a) living components, which include humans, animals and plants;
   (b) non-living components, which include land, water and air.

6. An environment is either:
   (a) natural, such as desert, jungle, sea and rivers; or
   (b) artificial, such as farms, cities, schools and factories.

Chapter 2 The relationship between environmental components

1. There is a basic relationship between the living components of an environment.

2. The relationship between given living organisms is eater–eaten.

3. Plants are a principal source of human and animal food.

4. The living components in the environment are of two types:
   (a) food producers (plants);
   (b) food consumers (humans and animals).

5. The basic relationships between living components take the form of elemental chains.

6. There is a balance among the living components in the environment.

7. There is a give-and-take relationship between living components and non-living components.

Chapter 3 Environmental resources

1. Items which can be obtained from the environment are called environmental resources.

2. Environmental resources are of two types:
   (a) living resources, which include animals and plants;
   (b) non-living resources, which include water, air and land.

3. Man obtains his daily requirements of food, clothing, medicine, etc. from plant resources.

4. Man obtains his daily requirements of food, clothing, etc. from animal resources.

5. Land environmental resources include sand and rocks.

6. Man obtains his daily requirements of water, air, gas, etc. from non-living environmental resources.

Chapter 4 Environmental pollution

1. Pollution is any existing element harmful to man's health.

2. Pollution can affect the land, water and air.

3. Various things can pollute the air, such as dust, smoke, etc.

4. Various things can pollute the seas and rivers, such as oil, waste from factories, rubbish and sewage.

5. Various things can pollute the land, such as waste and rubbish.

6. Noise can pollute the environment.

7. Governments legislate to protect the environment.

8. Every individual is responsible for the protection of the environment from pollution.

11. Use insecticides wisely and properly.

12. Avoid spraying insecticides close to food.

13. Avoid raising the volume of televisions, radios and tape recorders.

IV SKILLS

1. Recording and analysing observation.

2. Passing either written or verbal information to others.

3. Communicating written or verbal observation.

4. Asking questions.

5. Acquiring scientific skills in problem-solving such as:
   – determining the problem
   – collecting data
   – formulating alternative theories
   – choosing the best alternative
   – analysing data
   – drawing conclusions

The above educational objectives serve to confirm that the authors of the SCPS share with western scientists a common understanding of science in most aspects, such as facts, personal habits and skills. The only difference occurs in the attitudes and values-related objectives, in which the SCPS stresses that pupils should develop gratitude to God for his bounty. On the other hand, the western view of science does not involve any religious belief with the science curricula. The above educational objectives serve to indicate the overall direction and purpose of the units' activities and factual content. However, these objectives are general and lacking in specificity. They therefore may have little immediate benefit for the teacher in planning a

particular lesson or activity, in that they cannot direct the teacher's decisions on precise content, teaching method and assessment.

The authors of the SCPS do provide more specific, instructional objectives. These are useful when teaching a particular lesson or activity. These objectives, McNeil (1990) suggests:

> specify the behaviour to be exhibited by the student, a standard or criterion of acceptable performance, and the kind of situation in which the behaviour is to be elicited. (p. 246)

Cohen and Manion (1993) classify these objectives into two groups: (i) behavioural and (ii) non-behavioural. By way of definition, they state that 'a behavioural objective indicates a desired state in the learner, what a child will be able to do after a prescribed lesson, a behaviour that can be perceived by the teacher's unaided senses' (p. 34). On the other hand, non-behavioural objectives 'refer to more intangible qualities and being open-ended [statements] ... they do not specify the precise terminal behaviour by means of which a teacher can assess whether his objectives have been achieved' (Cohen and Manion, 1993, pp. 33–4).

The authors of the SCPS recognise both of these instructional objectives (behavioural and non-behavioural). At the beginning of every unit the authors suggest two models for planning appropriate lessons. In these models they clearly state the behavioural and non-behavioural objectives, teaching methods and method of assessment. These examples are meant to help teachers to plan their lessons following the same procedures. For example, for teaching sixth grades about the living resources of the

environment, the authors generate the following non-behavioural and behavioural objectives.

I NON-BEHAVIOURAL OBJECTIVES

This topic should help pupils to acquire the following experiences:

A. Scientific facts and concepts

1. The things that man gets from the environment and the benefits man obtains from environmental resources.

2. Environmental resources are of two types:
   (a) Living resources, which include plants and animals;
   (b) Non-living resources, which include water, air and land.

3. Man gets his daily requirements such as goods, clothing, medicine, etc. from plant resources.

4. Man gets his daily requirements such as goods, clothing, etc. from animal resources.

B. Attitudes and values

1. To thank God for the living resources of the environment.

2. To appreciate the importance of preserving the living resources of the environment and using them wisely.

3. To be individually responsible for preserving and protecting environmental resources.

4. To be inquisitive and curious about environmental resources.

C. Habits

1. To preserve the animals and plants of the environment.

2. To avoid over-consumption of environmental resources and to use them reasonably and wisely.

D. Skills

1. Analysing data and results.
2. Getting ideas across to others, in both written and oral form.
3. Asking questions.
4. Classification.

E. Interests and inclinations

This topic aims at getting students interested in the living resources of the environment in order to preserve and use them wisely.

II BEHAVIOURAL OBJECTIVES

At the end of this lesson on the living resources of the environment pupils should be able to:

1. Remember/know that animals and plants are the living resources of the environment.
2. Remember/know that the plant resources of the environment are varied, that they comprise, for example, grain, fruit, vegetables, timber, flowers.
3. Recognise man's basic necessities, which he gets from the plant resources of the environment, from a group of things used by him.
4. Enumerate the plant resources to be found locally.
5. Remember/know that the animal resources of the environment are varied, and comprise sheep, cows, goats, camels, poultry, rabbits, fish and other creatures.
6. Recognise man's basic necessities, which he gets from the living resources of the environment, from a group of things used by him.
7. Enumerate the animal resources which man gets from the local environment.

8. Classify a group of pictures of things one uses into two groups, the first containing pictures of things we get from plant resources, and the second containing pictures of things we get from animal resources.

9. Grasp that man gets his basic necessities from the living resources of the environment.

10. Explain the reason for man's interest in preserving the living resources of the environment.

The authors of the SCPS do not provide the behavioural and non-behavioural objectives for all topics in the curriculum. They only provide them for selected topics from every unit so as to give teachers the opportunity to formulate their own instructional objectives. At this point it should be noted that the authors of SCPS seem to overemphasise the objective components, especially in planning instructional lessons. To illustrate this, in the example given earlier, teachers were supposed to achieve 25 objectives (15 non-behavioural and 10 behavioural), in just one given topic. From a realistic point of view, this is too many for teachers to achieve in one lesson.

It is clear from the general, educational and instructional objectives that the curriculum concerns the developing of basic skills as well as the acquiring of basic scientific concepts. Moreover, it is concerned with the development of good and healthy habits. Only minimal attention is given to the fostering in pupils of positive attitudes towards Islamic belief and Arab culture, especially at the level of instructional objectives.

3.6.3 Content of the SCPS

Content design has several dimensions: scope, sequence and continuity. These are discussed in turn.

3.6.3.1 Scope

When considering the selection of material for the SCPS, the authors raised the following questions: what should be selected from the wide repository of science for the purpose of learning? what are the basic principles upon which the selection may be based? What follows is an outline of the most important principles which were taken into account when selecting the content of the SCPS. According to Abu-Huwage (1990), the content of the SCPS should do the following:

1. Accomplish the objectives stated by the Gulf Arab Bureau for teaching science at the primary stage.
2. Link knowledge and skills with their practical applications in out-of-school situations.
3. Include applications relating to the health and safety of the students in the primary stage.
4. Match the development stage and the capabilities of students.
5. Include aspects of the Arab and Islamic inheritance in general and that of the Arabian Gulf in particular.
6. Include learning experiences and activities designed to help students achieve the desired objectives.

Content is more than information to be taught and learned for school purposes, such as passing exams, moving from grade to grade, etc. Dewey (1944) argues that if content is to be more than information for school purposes, it should bear some relationship to questions with which pupils are concerned. In addition, Ornstein and

appears that the curriculum adopts Bruner's concept of a spiral curriculum. Bruner (1959) maintained that the curriculum should be organised according to the interrelationships between the basic concepts of each major discipline. For students to grasp these basic concepts, they should appear and reappear in a spiral fashion, increasing in depth and breadth as pupils progress through the grades.

Further, Abu-Huwage (1990), in considering the selection of the SCPS content, took into account the developmental stage of the pupils (ages 6–12). The material has been arranged according to the nature and capabilities of learners at this stage. For example, the curriculum presents ideas, facts, skills and concepts in accordance with the following considerations:

1. The simple before the complex.
2. The familiar before the unfamiliar.
3. The concrete before the abstract.
4. The direct before the indirect.
5. The present before the past or future.

3.6.4 Learning activities

The SCPS textbook includes two types of learning activities, principal learning activities and optional learning activities.

3.6.4.1 Principal learning activities

These activities are proposed by the textbook in order for students to achieve the objectives of the SCPS, to master facts and concepts, and to acquire desirable

inclinations and thinking skills. All students are required to participate in these types of activity.

3.6.4.2 Optional learning activities

These are scientific activities carried out over an extended time-period. They concern those students who have scientific inclinations and wish to further their scientific knowledge. Teachers are encouraged to conduct these activities whenever possible. The authors write:

> It is also possible, if the teacher finds it appropriate, to select some of these activities to be implemented in the classroom during the allocated time for teaching science. (Abu-Huwage 1990, p. 51)

3.6.5 Assessment

The SCPS textbook includes items for assessing the progress of the students in the material they have studied, in the light of the goals and objectives of the SCPS. The authors have ensured that the assessment items of each unit of the school-book have been distributed throughout the unit for each lesson, or two lessons or a number of lessons, depending on the nature of the subject in question, and have not been postponed until the end of the unit. This has been done in order to assess the progress of the student step by step.

The assessment items appear in the curriculum in different forms, among which are the following:

1. Circle the items required for selection and determination.
2. Draw a line between the objects.

3. Arrange the pictures numerically according to their occurrence, that is, like arranging the stages of growth of an animal or a plant.
4. Complementary questions.
5. Multiple choice questions.
6. Drawing questions.
7. Essay-type questions, that is, 'Mention ...', 'Write down ...', etc.

3.6.6 Curriculum design

Curriculum elements can be organised in numerous ways. However, all curriculum designs are either modifications or syntheses of three basic designs: (1) subject-centred designs; (2) learner-centred designs; and (3) problem-centred designs. Each category comprises several sub-categories (Ornstein and Hunkins, 1988). For example, subject-centred designs include subject designs, discipline designs, broad-field designs and correlation designs. In the case of SCPS in the Gulf States, the curriculum seems to integrate the broad-field design with the learner-centred design. Ornstein and Hunkins (1988) indicate that the broad-field design usually combines two or more related subjects into a single broad subject. For example, the science curriculum can be organised into the category of basic or general science, containing biology, physics and chemistry. The integration of related subjects into one broad subject is one of the main principles underlying the selection and organisation of the content of the SCPS. The authors of the fifth-grade science curriculum, for example, state:

> In this curriculum, physics, geophysics, chemistry and biology are integrated in the course of instruction. (Abu-Huwage 1990, p. 21)

The authors justify their statement by arguing that such a design helps pupils to develop wider experiences in different fields.

The authors of the SCPS were, it seems, greatly concerned about creating a curriculum that would be valuable for pupils. They emphasised that pupils must be the focus of the curriculum. They rejected the idea of the formal transmission of knowledge from teacher to pupil in which there is no room for the experience of participating in the learning process. Instead, they advocate the learner-centred design in which pupils would take an active part in the learning process (they find out, discover and investigate). They therefore designed the content and activities in the SCPS in such a way as to promote pupils' participation and improve their scientific skills. They stress that the content and activities of the SCPS were based on discovery learning. They insist that pupils should be encouraged to record observations, interpret results and findings, and draw inferences individually or in small groups. Moreover, they urge teachers to assume this responsibility appropriately (Abu-Huwage, 1990).

Although the authors of the SCPS claim that the content and activities are based on discovery learning, the Student's Textbook illustrates every experiment and summarises all the results obtained. Moreover, the authors ask questions such as 'What is the environment?', and provide the answer directly after the question. However, the activities have a distinct educational value in that they train pupils to follow instructions. They are clearly structured and explained, and the questions, throughout the SCPS, often furnish excellent materials for teaching, which provoke the interest and participation of pupils throughout the practical work. But again, the problem with these activities is that they have been set up for the learners. The pupils

can never believe that the activities and the experimental venture are of their own making. Solomon (1980) writes:

> Discovery can be recognised by two criteria. First, the query must spring directly from the children themselves, whether latent in their own private puzzlement or prompted by their immediate activities. Secondly, the way in which they choose to manipulate the apparatus that they use cannot be dictated ... The value of discovery lies in the open-ended experience that we try to promote and not in an achievement of the next stage in the curriculum. (p. 48)

Unfortunately, the authors of the SCPS do not provide a clear definition or view of discovery learning, so that it can be evaluated, nor do they give their reason for having designed the activities and the content in a very structured way. Another question emerges here, whether teachers are aware that the SCPS requires the discovery method for teaching it. Are teachers familiar with the discovery learning method?

3.6.7 Approaches to the curriculum

Any approach to the curriculum reflects the foundations of the curriculum: the developers' philosophy and view of history, social issues, psychology and learning theory, domains of the curriculum, important knowledge within specific fields, and the theoretical and practical principles of the curriculum (Ornstein and Hunkins, 1988). On a technical level, the SCPS appears to adopt the behavioural-rational approach, with, however, some modifications. This approach stems from the University of Chicago school of thought (Bobbitt (1918), Tyler (1949) and Taba (1962) are among the advocates of this approach). Ornstein and Hunkins (1988) argue that this approach:

> relies on technical and scientific principles, and includes models, plans, and step-by-step strategies for formulating the curriculum. Goals and objectives are specified, content and activities are sequenced to coincide with the objectives, and learning outcomes are evaluated in relation to the goals and objectives. (p. 2)

Moreover, advocates of this approach, especially Tyler (1949) and Taba (1962), stress that the following principles should be taken into account when designing curricula:

1. Learning has applications, and therefore can be transferred to other situations.

2. Learning is based on generalisations, rather than specific stimuli and specific responses.

3. When new concepts or activities are introduced, links should be made with positive experiences pupils have had.

4. Rote learning and the memorising of facts are unnecessary for the transfer of knowledge.

5. Problem-solving and discovery learning should be used as an instructional method that can lead to a wide transfer of learning to other situations.

The authors of the SCPS clearly advocate the above points, and considered them in the planning of the SCPS (Abu-Huwage, 1990). They stress that the learning of science in the SCPS is based on the teaching of important principles to explain concrete phenomena. Moreover, they emphasise that rote memorisation and drill methods should be avoided when teaching the SCPS. Alternatively, discovery learning should be used to stimulate the role of pupils in the learning process and to achieve the desired objectives of the SCPS. Further, the authors suggest that teachers should use the previous experiences of pupils to increase the likelihood that each pupil will find learning relevant and enjoyable.

Furthermore, the authors of the SCPS appear to adopt a model for curriculum planning similar to that of Taba (1962). Taba (1962) provides a seven-stage model

for curriculum planning. She believes that those who teach the curriculum should participate in developing it. She outlines seven major steps, into which teachers should have a major input (Figure 3.2).

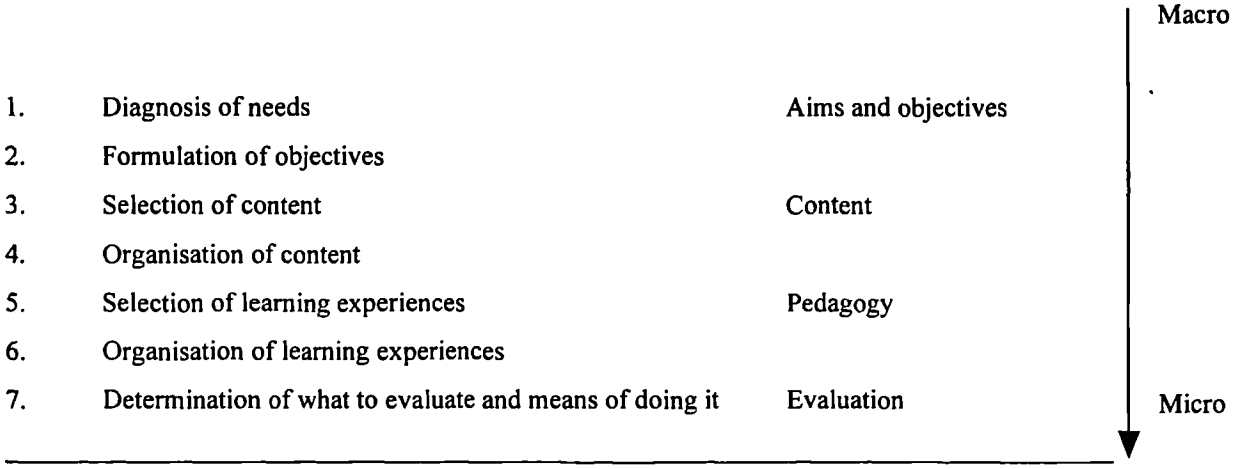


Figure 3.2 Taba's seven-stage model of curriculum planning
(Source: Morrison and Ridley, 1988, p. 38.)

Taba suggests that all curriculum planning should start with aims and end with evaluation. The SCPS in the Gulf States adopts the same view. The developers of the curriculum specify the objectives to be accomplished, the content of the curriculum units, the organisation and sequence of that content, teaching methods, learning activities and, finally, the assessment procedures that need to be considered by students and teachers (Figure 3.3). However, assessment in the SCPS is seen as continuous (formative) rather than terminal (summative), which can be seen as representing a difference between Taba's (1962) model of planning and the SCPS model.

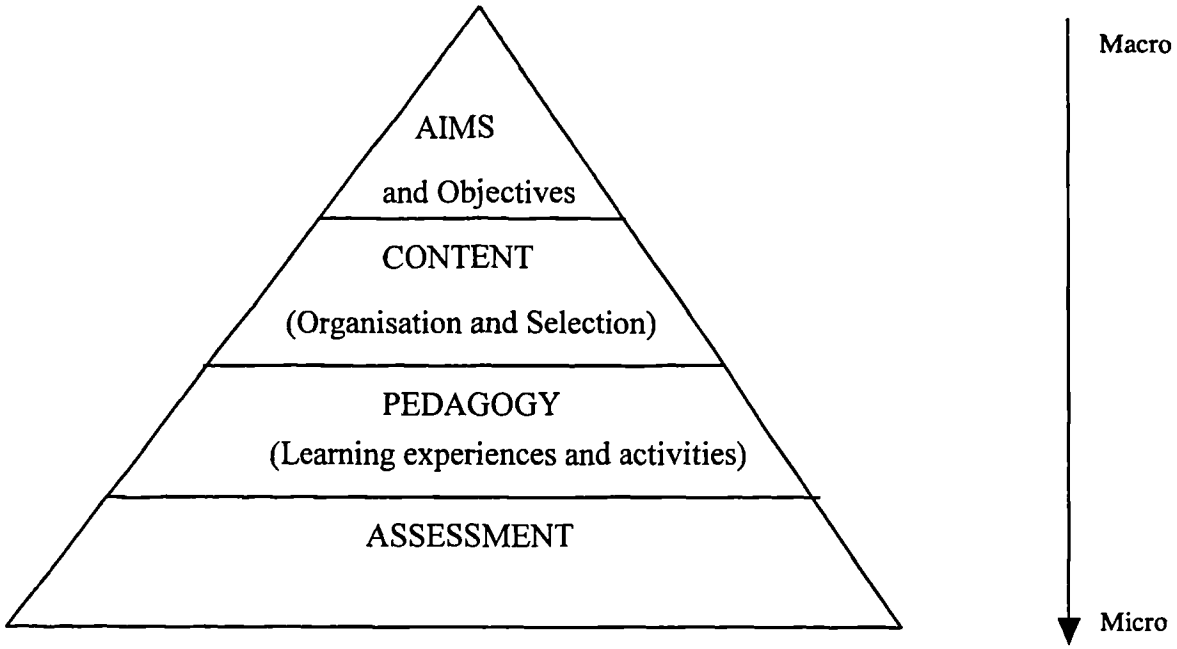


Figure 3.3 SCPS model of curriculum planning

Although the participation of teachers is an integral part of Taba's model, the SCPS model pays less attention to this aspect. Most of the participants are inspectors, supervisors or experts. The only time teachers participated in the curriculum was in the revision phase: their suggestions and recommendations were taken into account when revision of the curriculum was being considered.

3.6.8 The curriculum and instruction

The relationship between curriculum and instruction is a controversial issue both in professional literature and in current curriculum texts (Ornstein and Hunkins, 1988). For example, both Tyler (1949) and Taba (1962) are concerned with instruction in their models of curriculum planning. This is especially true of Tyler (1949), who takes the view that curriculum and instruction are equally important and part of a continuous process, involving constant replanning and reappraisal. Taba (1962),

however, identifies instruction as something apart from curriculum, something which does not have the same weight.

The authors of the SCPS in the Gulf States seem to take the view that instruction is an integral part of the curriculum. They offer some general thoughts and recommendations for teachers considering teaching the SCPS. For example, Abu-Huwage (1990) states that there are as many teaching methods as there are teachers. There is no one teaching method which is successful in every context. However, an effective teaching method should lay emphasis upon (1) scientific processes (rather than scientific facts), such as critical thinking, problem-solving and creativity, which can help children develop scientific skills and positive attitudes towards science; and (2) the need to give pupils an active role during the learning process, because children learn better when they play an active role in learning situations. Moreover, the SCPS suggests that an effective teaching method should help students:

1. Acquire skills which can help them solve their problems inside and outside school.
2. Acquire skills which enable them to increase their knowledge and further their education by themselves.
3. Focus on scientific thinking rather than on memorising facts.
4. Develop their personal identity and freedom of thought.

Further, the SCPS authors suggest a particular teaching method to be adopted within the curriculum. They suggest to teachers methods for teaching every single fact or scientific concept throughout the curriculum. For example, Table 3.1 demonstrates

the suggested teaching methods for all the facts and scientific concepts for the first lesson of unit 1 (sixth-grade curriculum).

Despite the fact that the SCPS provides teachers with guidelines on effective teaching methods and detailed instructions for teaching the concepts and facts of the curriculum, teachers in Qatar are still using the traditional teaching methods in their classrooms. Al-Sada (1992) points out that the usual method of teaching science in Qatar is to focus on memorisation. The teacher's role is to deliver information, and so the teachers depend on textbook and blackboard as a means of illustrating facts and concepts. Al-Sada believes that this type of teaching ignores the student's opinions and needs. Moreover, it is content-oriented rather than oriented towards scientific progress. Al-Sada investigated the extent to which female science teachers implement and use the new teaching methodologies, such as problem-solving, discovery learning and learning-by-doing, in their classrooms. Her findings were as follows:

1. The majority of teachers do not implement new teaching methodologies in their science classes.
2. Teachers do not encourage students to use what they have been taught in the outside world.
3. It is rare for teachers to encourage students to follow scientific procedures in discovering or solving problems.
4. It is rare for teachers to use educational films or scientific tools.

Table 3.1 Suggested methods for teaching the facts and the scientific concepts of the first lesson from unit 1 (sixth grade science curriculum)

Topic	The facts and scientific concepts	Suggested learning activities	Educational aids	Notes
First: definition of the environment. What is the environment? Second: Kinds of environment on the Earth.	1. The environment is the place the living creatures inhabit, in which they find their requirements for life, such as water, air and food. The Earth is made up of two principal types of environment: - land environment - water environment. 3. There are various specific land environments, such as desert, farmland, jungle and Eskimo environments. 4. There are various specific water environments, such as sea environments and river environments.	1. Discussing pupils' previous experiences with the topic. 2. Displaying and identifying the kinds of environments on Earth. 3. Doing the preliminary exercises (textbook, p. 4). 4. Doing the preliminary exercises (textbook, p. 6). 5. Showing a group of pictures of different environments and asking pupils to identify the pictures representing the land environment. 6. Showing a group of pictures of different environments and asking pupils to identify pictures representing the water environment. 7. Classifying a group of pictures into two groups (land and water environments). 8. Showing a film on an environment. 9. Doing the relevant section entitled 'I write the new words' (textbook, p. 15) and the section entitled 'I test my knowledge' (textbook, p. 17). 10. Showing and discussing the prictures in the textbook.	1. Model of Planet Earth 2. Pictures of different environments. 3. Educational film on an environment. 4. Pictures of animals from different environments. 5. The textbook.	Teachers are recommended to take pupils on a field trip to the surrounding environments in order to connect what has been learned with real life.

Source: Shiqeliya (1992), p. 133.

She adds that teachers reported a number of reasons for their existing practice, as follows:

1. The syllabus is too extensive.
2. The allocated time for teaching is insufficient.
3. The students are passive.

The main questions which emerge from the above discussion of cirriculum and instruction are these:

1. Why do teachers in Qatar still use traditional teaching methods in their classrooms?
2. Did the planners of the SCPS examine the quality of teachers in the Gulf States before planning the curriculum?
3. Have teachers been trained to apply the SCPS in classrooms?
4. Are teachers satisfied with the teaching methods suggested by the curriculum?
5. Did the planners of the SCPS consider the limitations of schools in the Gulf States, especially in Qatar, such as overcrowded classrooms, insufficient time for teaching and ill-equipped laboratories, before planning the curriculum?

In the light of the above it can be argued that, in order for teachers in Qatar to cope adequately with new trends in science, and the new science curriculum in particular, they need effective and practical methods of teaching.

3.6.9 Strengths and weaknesses of the curriculum

The SCPS appears to represent a new stage in curriculum development in the Gulf States, particularly in Qatar. The strengths and weaknesses of the curriculum can be outlined as follows.

3.6.9.1 Strengths

1. The curriculum reflects the perspective of different experts from different countries, professions and levels of education who have participated in the process of planning, developing, designing, testing, revising and implementing the SCPS (see Appendix 1).

2. The authors state clearly their philosophy, aims and objectives, their criteria for selecting content, the desired teaching method, and evaluation procedures.

3. The SCPS is contained in the following books and manuals: the Student's Textbook; the Teacher's Handbook; the Activities Manual; an evaluation and examination manual. These books and manuals aim to help students enjoy learning science, while providing teachers with the appropriate resources and materials to improve their teaching methods.

4. Interaction between teacher and students and among students themselves has been expected and emphasised.

5. The SCPS was revised following comprehensive pilot testing. Teachers' recommendations and suggestions were considered in the revision phase.

6. The SCPS contains numerous illustrations (pictures and drawings) and examples to aid understanding of the content.

3.6.9.2 Weaknesses

1. The representatives from Qatar who are participating in developing the curriculum are not Qatari citizens: they come from other Arab countries. They are highly qualified in terms of experience and knowledge, but in terms of culture they are not representative.

2. The planners of the SCPS curriculum apparently did not examine the quality of teachers in the Gulf States, especially in Qatar, before planning the curriculum. Such a curriculum needs highly qualified teachers to implement it in the desired way. Bellon *et al.* (1992) point out that implementing discovery learning in classrooms is not an easy task. They stress that teachers who use discovery learning must create a series of problems and experiences that give pupils the chance to explore and discover key concepts. Simon (1986, p. 42), describing the roles of teachers who engage in discovery learning, suggests that teachers should: identify and prioritise what is to be learned; distinguish between facts, procedures and concepts; organise concepts hierarchically; divide what is to be learned into appropriate increments; create or adapt activities that stimulate the development of the desired concept.

During the discovery tasks, he suggests that teachers should ask questions that promote reflection, provide sub-tasks when the original problem is too difficult, and assess pupil understanding regularly (Simon, 1986). The question that arises here is whether teachers in Qatar can assume these responsibilities. Al-Atari (1989) points out that large numbers of primary school teachers in Qatar are not qualified because they have not undertaken an appropriate training programme. Similarly, Kamal (1990) states that teachers are unable to implement new teaching methods because of their poor preparation.

3. Although the editorial quality of the curriculum is high, some spelling mistakes and words out of context were found.

4. The curriculum is inconsistent with the education system in Qatar in terms of assessment. The curriculum operates on the basis that students construct their knowledge and skills over time. Therefore it is important that students have regular benchmarks with which to measure what they understand or do not understand. The education system in Qatar, however, approves the traditional pencil-and-paper multiple-choice tests. According to the UNESCO Report (1990), the examinations in Qatari schools are content-oriented and focus mainly on pupils' memory. As a result, teachers have to make up their minds on the matter of assessment. The likelihood is that they will follow the education system.

5. The curriculum puts heavy demands on teachers to accomplish the desired objectives, while denying that classrooms are overcrowded. The time allocated for teaching is insufficient, and laboratories are not well equipped, which may put teachers under enormous pressure and stress.

Chapter 4

Review of the Literature on Co-operative Learning

4.1 Introduction

This chapter reviews the relevant available literature on co-operative learning methods. The review covers the following areas: historical background; theoretical framework; definition of co-operative learning; types of co-operative learning; and review of empirical studies on the outcomes of co-operative learning, with special reference to achievement. The review of empirical studies is both international and regional. The term 'international literature' is used to refer to sources of information obtained from countries outside the Middle East, and the term 'regional literature' to refer to sources within the Middle East. Comments on the review will be given at the end of the chapter. Chapter 5 will then deal with the essential arrangements for and the cultural orientation of co-operative learning, with special reference to Qatar.

4.2 Historical background

Co-operative learning, as Kutnick and Rogers (1994) point out, is not a new phenomenon:

> From the earliest recorded writings about education (certainly from Plato and Socrates) we see that learning takes place in a group context. This group context has, minimally, two elements vital to support the social process of learning – a number of individual pupils and a 'teacher' (one who has knowledge or information that others wish to obtain). ... Socrates provided problem-solving tasks for his students and supported his learning context though 'dialogue' between expert (the knower) and novice. The dialogues also allowed the novices to generate and discuss ideas amongst themselves. The Socratic dialogue allows two types of learning dynamic, that appropriate answers may be confirmed by the expert and that mutually naive novices may speculate amongst themselves and thus generate new ideas to be tested. (p. 2)

In England during the late 1700s, Joseph Lancaster and Andrew Bell used co-operative learning groups extensively in their work, and the technique was subsequently introduced to America in 1806, when a Lancastrian school opened in New York City. In the last three decades of the nineteenth century, Colonel Francis Parker received widespread recognition for introducing the idea of co-operative learning into public schools. His success was founded on his ability to create a co-operative and democratic classroom atmosphere. During his period as Superintendent of Schools at Quincy, Massachusetts (1875–80), an average of 30,000 visitors a year examined his use of co-operative learning procedures (Johnson and Johnson, 1991).

Following Parker, John Dewey promoted the use of co-operative learning. He insisted that a child's experience must, from an early age, involve interaction with others to develop the character required for survival in the community. In the late 1930s, however, competition was emphasised in public schools (Pepitone, 1980). In the 1940s, Deutsch proposed a theory of co-operative and competitive situations that served as the foundation for subsequent research on co-operative learning. After a number of years, and following numerous research studies which provided evidence of the efficacy of co-operative learning, schools in America and Europe began to adopt and use co-operative learning strategies. Co-operative learning is thus one of the most thoroughly researched instructional methods (Slavin, 1989–90).

4.3 Theoretical rationale for co-operative learning

Co-operative learning can be justified in terms of established theories of children's learning. Bennett (1994) points out that an interest in children learning co-operatively in groups:

> stems from various sources. These include a realisation among educators of the value of interpersonal processes in both learning and social relationships, an increasing awareness of the value of co-operation and problem-solving in the development of understanding and a desire to move away from instructional models which view teachers as the only source of knowledge and skills. (p. 51)

This point of view coincides with current theories of learning and development, especially the theories of Deutsch (1949), Piaget (1950) and Vygotsky (1978) that social interaction is an essential factor for enhancing children's learning. Bruner and Haste (1987) emphasise the importance of the social context for children's learning as follows:

> A quiet revolution has taken place in developmental psychology in the last decade. It is not only that we have begun to think again of the child as a *social being* – one who plays and talks with others, learns through interactions with parents and teachers – but because we have come once more to appreciate that through such social life, the child acquires a framework for interpreting experience, and learns how to negotiate meaning in a manner congruent with the requirements of the culture. 'Making sense' is a social process; it is an activity that is always situated within a cultural and historical context.
>
> Before that, we had fallen into the habit of thinking of the child as an 'active scientist', constructing hypotheses about the world, reflecting upon experience, interacting with the physical environment and formulating increasingly complex structures of thought. But this active, constructing child had been conceived as a rather isolated being, working alone at her problem-solving. Increasingly we see now that, given an appropriate, shared social context, the child seems more competent as an intelligent social operator than she is as a 'lone scientist' coping with a world of unknowns. (p. 1)

The developmental perspective in co-operative learning is based on the theories of Vygotsky (1978) and Piaget (1950). Vygotsky viewed much of children's learning as occurring through feedback derived from social interaction. He believed that social interaction is the key to learning how to think and learn; he also argued that social interaction improves a child's ability to gain and understand new knowledge.

Moreover, he argued that what children can do today in co-operation they will tomorrow be able to do on their own (Wood, 1988). Piaget's theory agreed with Vygotsky's in regarding social interaction as a major factor in the development of skills and concepts. Piaget argued that the ability to see another's point of view, without losing one's own, is gradually acquired through repeated social interaction in which the child is exposed repeatedly to the viewpoints of others (Kamii and De Vries, 1988).

The motivational perspective on co-operative learning emphasises the reward or goal structure within which pupils in the group work. For example, Slavin (1993) argues that:

> rewarding groups based on group performance (or the sum of individual performances) creates an interpersonal reward structure in which group members will give or withhold social reinforcers (e.g. praise, encouragement) in response to groupmates' task-related efforts. (p. 4)

The theory of co-operation, which was the foundation for co-operative team learning techniques, was first developed by Deutsch (1949). The two fundamental components of the theory are goal structure and reward structure. Deutsch described goal structure as occurring when students perceive their relationships with other students (in group settings) as interdependent. In other words, group members must depend on each other in order for the task to be completed. Deutsch hypothesised that perceived interdependence will result in group members working together more frequently, and with more co-ordination on their workload. The result of this division of work is a better atmosphere in which to work.

In Deutsch's theory of co-operation, the reward structure is one in which 'the whole' is rewarded rather than 'the part'. Reward for successfully completing a task is given to the entire group, not to individuals. This type of reward structure also affects the goal structure because it strengthens the perceived interdependence of the group members.

4.4 Basic concepts of co-operative learning

Several educators and proponents (Slavin, 1987a; Johnson and Johnson, 1989–90; Parker, 1985) have offered definitions or provided the basic essentials of co-operative learning. For example, Heinich *et al.* (1993) offer a mechanical definition without any conditions or specifications. They define co-operative learning as:

> an instructional configuration involving small groups of learners, working together on learning tasks rather than competing as individuals. (p. 443)

Alternatively, Slavin (1987a) has offered a definition which stresses that pupils should work in mixed ability groups. Slavin defines co-operative learning as a:

> set of instructional methods in which students work in small, mixed-ability learning groups. (p. 8)

Moreover, he stresses that the three concepts central to these methods are individual accountability, team rewards and equal opportunity for success.

Sharan and Sharan (1987) offer a definition of co-operative learning as giving all students the right to decide what and how to learn:

> Students help each other learn, share ideas and resources, and plan co-operatively what and how to study. (p. 21)

This type of co-operative learning cannot be applied in Qatar, where the Ministry of Education plans what and how pupils study; teachers and students do not take part in the planning processes.

Johnson, Johnson and Holubec (1990) offer a definition of co-operative learning without specifying any conditions regarding ethnicity, gender or achievement level. However, they place emphasis upon the outcomes rather than the processes or conditions. They define co-operative learning as an:

> instructional use of small groups so that students work together to maximise their own and each other's learning. (Johnson and Johnson, 1992, p. 174)

Another definition, provided by Parker (1985), limits co-operative learning to academic tasks rather than any tasks. Parker states that co-operative learning is a:

> classroom learning environment where students work together in small heterogeneous groups on academic tasks. Within such groups students are encouraged to share ideas and help each other learn. They pool resources, share discoveries, justify their thinking, and critique each other's ideas. (p. 48)

Now that some of the connotations ascribed to the term co-operative learning have briefly been presented, one can observe that the definitions exhibit both similarities and dissimilarities. The commonalities include co-operative efforts among learners, group goals, and the necessity for social skills (Parker, 1985; Sharan and Sharan, 1987; Slavin, 1987a). The differences stem from the fact that some definitions include conditions regarding grouping ability, gender and ethnicity (Slavin, 1987a), while other definitions are broad and general (Johnson *et al.*, 1990; Sharan and Sharan, 1987).

From a critical review of the available definitions of co-operative learning one may conclude that most of them focus on the physical arrangements of pupils and outcomers rather than on learning processes. In addition, all definitions focus on the learner, and have neglected the crucial role of the teacher and the importance of a well-structured curriculum. The teacher's role and a well-structured curriculum, however, are equally important in co-operative learning if it is to be effective. From a general perspective, Bellon *et al.* (1992) stress the importance of the role of teachers in any learning environment:

> Whenever attempts are made to reform or improve education, teachers are the centre of attention. Perhaps this is the way it should be. Student learning is most often influenced, guided and facilitated by teachers. The transactions that take place between students and teachers are really the heart of the educational process. (p. 13)

Similarly, Bloom (1972) points out that the method of teaching is the key to improving learning:

> It is the teaching, not the teacher, that is the key to the learning of students. That is, it is not what teachers are like but what they do in interacting with their students that determines what students learn and how they feel about the learning and about themselves. (p. 339)

On the other hand, Cohen (1986), from a co-operative learning perspective, indicates that the teacher's role in co-operative learning is completely different from his role in traditional teaching. He assigns a number of roles to teachers, including: setting up the direction of the task; assigning pupils to groups; assigning pupils' roles; setting down the various rules for behaviour; training pupils to use norms for co-operation; evaluating products. In another text supportive of co-operative learning, Johnson *et al.* (1991) offer a list of roles for teachers in co-operative learning:

> There is more to the teacher's role in structuring co-operative learning situations, however, than structuring co-operation among students. The teacher's role includes five major sets of strategies:
>
> 1. Clearly specifying the objectives of the lesson.

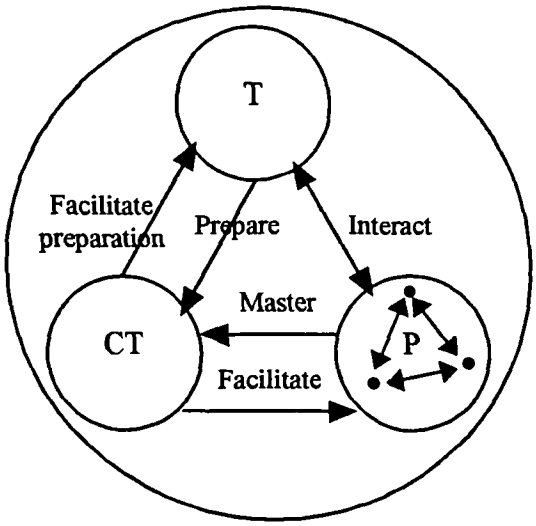
2. Making certain decisions about placing students in learning groups before the lesson is taught.

3. Clearly explaining the task and goal structure to the students.

4. Monitoring the effectiveness of the co-operative learning groups and intervening to provide task assistance ... or to increase students' interpersonal and group skills.

5. Evaluating the students' achievement and helping students discuss how well they collaborated with each other. (s. 2:3)

Equally important for teachers in co-operative learning is a suitable curriculum. For example, Good *et al.* (1989–90) point out that existing textbooks are designed for pupils to work with on their own. Such textbooks encourage individualistic learning and discourage social interaction. It can be argued from the above that the role of the teacher, and a curriculum designed for co-operative learning, are extremely important. A definition which takes these things, and also the position of the learner, into account is therefore desperately needed. In this context, co-operative learning may be defined as a classroom environment that facilitates co-operation among students. The students work together in small groups, interacting positively to maximise their learning. The teacher's role is to plan, direct, facilitate and assess the students' performance. The curriculum is designed to facilitate the implementation of the collaborative processes.



• pupil CT curriculum Task
T teacher P pupils

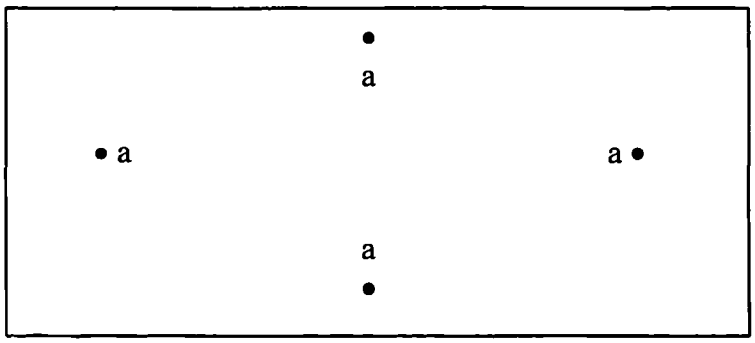
Figure 4.1 A model for identifying the co-operative learning situation

In an ideal co-operative learning environment involving teacher, pupils and curriculum, the curriculum should serve to facilitate the pupils' learning and the teachers' preparation processes. The teacher interacts with the pupils to facilitate, monitor and assess them. Pupils interact with each other positively, including sharing ideas, helping each other, pooling means, and criticising each other's ideas. Figure 4.1 illustrates this point.

4.5 Types of co-operative groupwork

Dunne and Bennett (1990) suggest that certain types of class management and certain types of tasks differ in the way in which they promote co-operation among pupils. Moreover, they point out that co-operation increases when pupils are asked to work together for a joint product; co-operation is very important to realise the demands of the task. They offer three possible models for the different types of task, as follows:

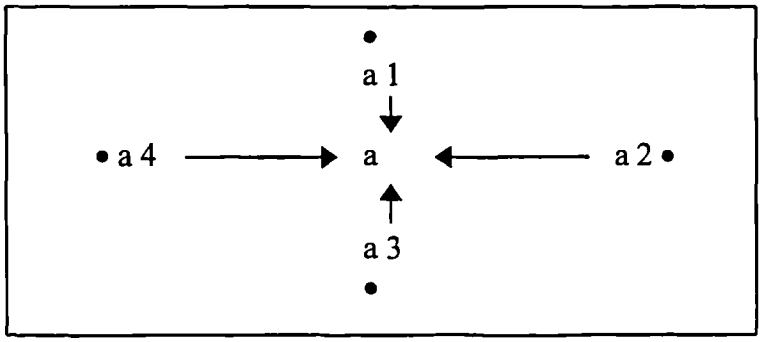
1. Working individually on identical tasks for individual outcomes. In this kind of task, children are engaged on the same task (a), but the aim is for an individual to produce an individual outcome (Figure 4.2). Bennett (1994) argues that the need for co-operation in this type of task structure is low. Dunne and Bennett (1990) maintain that it generates discussion of low quality, and children often seem confused about whether they are allowed to work together or not.



• = children
a = task

Figure 4.2 Children working individually on identical tasks for individual products (Source: Dunne and Bennett, 1990, p. 13)

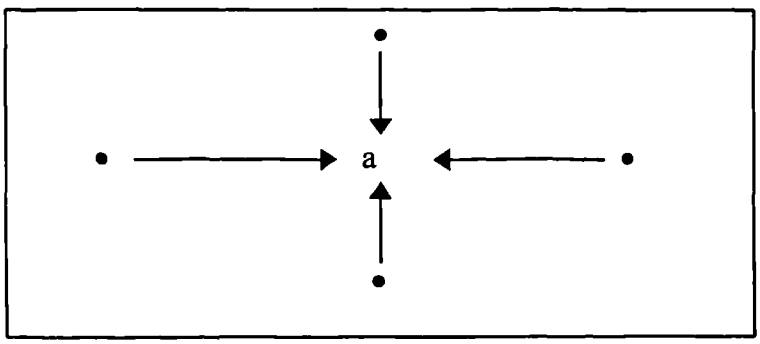
2. Working individually on 'jigsaw' elements for joint products. In this kind of structured task, the task is divided into as many elements as there are group members. Each member works on one element of the task (Figure 4.3). Bennett (1994) points out that in this kind of task structure the demand for co-operation and individual accountability is high, because everyone in the group is responsible for a part of the task.



• = children
a = task

Figure 4.3 Children working individually on jigsaw parts for joint product (Source: Dunne and Bennett, 1990, p. 14)

3. Working jointly on one task for a joint product. In this kind of task structure, children work co-operatively to produce one product required of the group (Figure 4.4). Each group member's work has an impact on the group outcomes (Bennett, 1994).



• = children
a = task

Figure 4.4 Children working jointly on one task for joint outcome (Source: Dunne and Bennett, 1990, p. 14)

4.6 Co-operative learning strategies

There are a number of different co-operative learning strategies as well as variations among them. Each strategy falls into one of the three categories described above. Slavin (1989–90) suggests that variety is necessary because the strategies have different functions or domains of usefulness. Moreover, teachers have the opportunity to choose the type of instruction which best suits their classrooms. The co-operative strategies all provide different degrees and kinds of experience.

According to Johnson *et al.* (1991), co-operative learning occurs in many forms, but the following elements are common to all strategies:

1. Positive goal interdependence
2. Face-to-face interaction among pupils
3. Individual accountability for mastering assigned task
4. Use of interpersonal and small-group skills

However, the increasing number of techniques practised within co-operative learning brings disadvantages as well. They may confuse teachers, especially new starters, because these structures range from simple to highly-structured strategies each having its own distinct purpose, means of implementation and method of evaluation; this can cause confusion as regards which strategy is most appropriate in a given context. Moreover, becoming familiar with these strategies requires time, effort and money. Table 4.1 presents some of the most recognised co-operative learning structures, with a brief description.

Table 4.1 Overview of selected co-operative learning methods

Structure	Brief description
Student Teams Achievement Division (STAD) (Slavin, 1978a)	Four-member learning teams (mixed in performance levels, sex and ethnicity); after the teacher presents a lesson, students work in teams and help each other to master the lesson. Students then take individual quizzes; team rewards are earned. Applicable to most grades and subjects; however, it is most appropriate for teaching well-defined objectives.
Team-Games-Tournament (TGT) (De Vries and Slavin, 1978)	Using the same teacher presentations and team work as in STAD, TGT replaces the quizzes with weekly tournaments in which students compete with members of the other teams with similar academic records. Low achievers compete with low achievers (a similar arrangement exists for high achievers). The winner of each tournament brings six points to his/her team. Team-mates help each other to master material; however, during competitions, helping others is not allowed. Applicable to most grades and subjects.
Team Assisted Individualisation (TAI) (Slavin *et al.* 1986)	Four-student learning teams (mixed ability groups as with STAD and TGT); TAI combines co-operative learning and individualised instruction and is applicable only to mathematics in grades three through six. Students take a placement test, then proceed at their own pace. Students help each other with problems. Without help, students take tests that are scored by student monitors. Each week the teacher evaluates and gives team rewards.
Group Investigation (Sharan and Sharan, 1989–90)	Groups are formed according to common interest in a topic. Students plan research, take individual tasks, summarise findings, and present the findings to their class.
Learning Together (Johnson and Johnson, 1989–90)	Uses four- or five-member heterogeneous groups on assignment sheets. Each group hands in a single sheet, and receives rewards based on the group product. Learning together has five essential elements: positive interdependence; face-to-face interaction; individual accountability; social skills; group processing.
Co-operative Integrated Reading and Composition (CIRC) (Madden *et al.*, 1986)	CIRC is designed to teach reading and writing in the upper elementary grades. Students are assigned to teams formed of pairs of students from different reading levels. Teacher works with one team, while other teams engage in cognitive activities: reading, predicting, summarising, and learning vocabulary. Groups follow a sequence of teacher instruction, team practice, team pre-assessments, and quizzes. Students are not given the quizzes until the team feels each student is ready. Team rewards are given.

Table 4.1 (cont.)

Jigsaw (Aronson *et al.*, 1978)	Uses six-member teams to work on academic materials that have been divided into sections. Each team member reads his/her section. The students of different teams who have studied the same sections meet to become experts. Students return to groups and teach other members about their sections. Students should listen carefully to their team-mates to learn about other sections.
Jigsaw II (Slavin, 1987b)	Students work in four- or five-member teams. Students read a common academic material. Students also receive a topic on which to become expert. Members with the same topics meet together as in Jigsaw to become expert, and then they return to their groups to teach about their parts. Students take individual quizzes; teachers produce team scores based on each student's test performance.
Co-op Co-op (Kagan, 1989–90)	Co-op Co-op consists of a 10-step structure in which students in groups produce a project to share with the whole class. Each student has his/her part of the mini-topic and makes a contribution toward the class project.
Small-Group Mathematics (Davidson, 1980)	Students are divided into groups of four; in forming groups teacher considers students' choices of who they prefer to work with. Students work to achieve a group solution for each problem, share leadership, listen carefully to other members, and contribute to the ideas of others. The teacher may use test and quizzes, group projects, homework, and self- and peer-evaluation.

Note: The co-operative structures summarised in Table 4.1 appear in condensed format and further reading is required to provide a more detailed picture.
Source: Adapted from Manning and Lucking, 1991 and Kagan, 1989–90.

4.7 Review of relevant literature on co-operative learning outcomes

There is a large body of documented research on co-operative learning, especially in Britain and the United States. This research investigates two main aspects of co-operative learning: academic performance and social skills. In the Middle East, however, only a small number of research projects have been carried out to investigate the suitability and effectiveness of co-operative learning. In this chapter, the review of the literature is divided into two parts. The first part examines the international studies, mainly British and American, with special reference to academic

performance. Kutnick (1994) states that most reviews of co-operative learning groups in schools:

> begin by comparing the types of studies and are dominated by the cultural distinction between the United States and the United Kingdom. It is an unavoidable division in approach. Group work in classrooms is represented quite distinctly in these cultures. A majority of the American studies test specific hypotheses and take an experimental approach to the study of groups; in the UK studies come from a different tradition, observing what teachers actually do in class. There are advantages and disadvantages to both of the approaches. (p. 13)

The second part of the review focuses on the regional studies, with special reference to cultural context and outcomes. Regional studies are given careful attention and a greater depth of analysis, because they are more relevant to the present study from the point of view of resources and circumstances.

4.7.1 International studies

4.7.1.1 Classroom groups in the United States

Reviewers of the research on classroom groups in the United States consistently report that small groups do not represent a teaching method commonly used in the classroom (Bennett and Dunne, 1990; Galton and Williamson, 1992). The reviewers state that whole-class instruction is the predominant method of classroom instruction used by teachers in class. A substantial body of research on co-operative learning has been carried out in the United States. Not all of these publications are reviewed here; rather, an attempt has been made to select the well-known contributors in this particular field. The criterion of selection was how widely the authors have been referenced. Reviewers frequently cite co-operative learning studies carried out by Robert Slavin, Kagan Spencer and David and Roger Johnson as evidence of effective groupwork. These researchers incorporated co-operative learning into the classroom and examined

its effectiveness against individual, competitive and whole-class instruction. All of them devised at least one new approach to co-operative learning. The following discusses some empirical studies undertaken by these reviewers and others.

The evidence provided by US studies about the role of co-operative learning in improving pupil performance and social skills is overwhelming. Johnson *et al.* (1986), for example, made the following claims after conducting more than 25 studies and reviewing a large body of research into co-operative learning:

> Achievement will be higher when learning situations are structured co-operatively rather than competitively or individualistically. Co-operative learning experiences, furthermore, promote greater competencies in critical thinking, more positive attitudes toward the subject areas studied, greater psychological health, and greater perceptions of the grading system as being fair. (p. 29)

Similarly, Slavin (1989–90) supports the positive impact of co-operative learning on achievement, arguing that:

> after nearly two decades of research and scores of studies, a considerable degree of consensus has emerged. There is agreement that – at least in elementary and middle/junior high schools and with basic skills objectives – co-operative methods that incorporate group goals and individual accountability accelerate student learning considerably ... Research must continue to test the limit of co-operative learning ... Yet what we know is more than enough to justify expanded use of co-operative learning as a routine and central feature of instruction. (p. 54)

The US studies have tended to focus on evaluating the superiority of one technique against the other in terms of achievement gains and social development, and on examining the effectiveness of co-operative learning on pupils of different backgrounds, races, educational levels, ages and genders, and pupils studying different subject-matters (Johnson *et al.*, 1981; Newmann and Thompson, 1987).

Newmann and Thompson (1987), in their meta-analysis of co-operative learning techniques, investigated five major co-operative learning techniques in the United

States. These techniques were: Students Teams Achievement Division (STAD); Teams-Games-Tournament (TGT); Jigsaw; Learning Together; and Group Investigation. The criteria for the studies involved in this analysis were that they included an experimental treatment which involved co-operative tasks and a group product or a group reward structure, and the use of a control or comparison group. The analysis focused only on studies with a sample of at least twenty subjects, lasting at least two weeks, and conducting a testing of individual achievement. Twenty-seven reports, involving 37 comparisons of co-operative learning against control methods, met these criteria and so were reviewed. Most of the studies which the researchers selected randomly assigned the different research treatments to the classes. In addition most of the studies reported pre- and post-test comparison between groups and control groups.

Twenty-five (68%) of these studies using co-operative methods demonstrated a positive result at the 0.05 level of significance. Comparisons of 28 of the main effects on overall achievement revealed effect sizes ranging from -0.87 to 5.15. Newmann and Thompson (1987) also reported that, of the five learning techniques reviewed in the meta-analysis, Student Teams Achievement was the most successful (89%) and Jigsaw the least successful (17%), while Teams-Games-Tournaments (75%), Learning Together (73%) and Group Investigation (67%) all demonstrated a high level of success. The researchers selected more studies carried out in science classrooms than in other subjects. Interestingly, the highest success rates were in mathematics and language-arts classrooms.

The conclusion reached by Newmann and Thompson's meta-analysis research should be viewed with caution, owing to methodological problems. The researchers compared studies which differed in their durations, settings, physical arrangements, teacher training methods, implementation times and type of tasks without taking into consideration that these factors can affect the result of the comparisons. Moreover, this meta-analysis showed that the significance levels of the techniques recorded in these studies differed in terms of performance without addressing the questions of how and why.

Another meta-analysis is that conducted by Johnson *et al.* (1981). This reviewed 122 studies which examined the effects of co-operation, co-operation with inter-group competition, interpersonal competition, and individualistic effort on achievement and productivity. The studies reviewed included research comparing the effects of goal structures on pre-school students, school-age children, post-secondary students and adults, in terms of achievement and productivity in map behaviour, industrial arts, acting, maze learning, puzzle solution, committee productivity and sports performance, in addition to academic tasks. The study found that, in promoting achievement and productivity, (a) co-operation is more effective that competition; (b) co-operation is superior to individualistic effort; (c) co-operation without inter-group competition is more effective than co-operation with inter-group competition; and (d) there is no significant difference between interpersonal competitive and individualistic goal structures. Johnson *et al.* also hypothesised that the superiority of co-operation became more marked when more subjects were required to produce a group product involving tutoring each other, and researching the materials being learned, rather than

role decoding or correcting. This conclusion, however, has been disputed by Cotton and Cook (1982). They argue that the general conclusion that co-operation is most effective for achievement and productivity is contradicted in the meta-analysis itself, having found statistically significant interactions on productivity and achievement outcomes between co-operation/competition and ten different factors, including type of task, resource sharing, task interdependence and other factors.

The study of Johnson *et al.* (1981) was multi-approach – for example, it included secondary school, pre-school and adult education – but the researchers made no effort to justify this. Three major problems with this meta-analysis can be identified:

1. The researchers looked at studies carried out at different times, from 1924 till 1980, not considering the fact that circumstances change over time.

2. The study was not very specific, as the research tried to examine a large number of factors. The point here is that no single study can examine all aspects simultaneously.

3. The study did not consider age differences or cultural differences.

Ellis (1988) conducted a comprehensive meta-analysis investigating the effect of co-operative learning on achievement. Thirty-seven selected studies compared one or more of the four goal structures (co-operation, co-operation with inter-group competition, interpersonal competition, and individualistic effort) with one of the co-operation goal structures which were included in the analysis. Two methods of meta-analysis were used in the study: the vote score method and the effect size method. Ellis's study reached the following conclusions:

- There was no significant difference in overall academic achievement between students taught under co-operative and non-cooperative goal structures.

- The use of different goal structures in mathematics and reading instruction led to no significant difference in achievement.
- The use of co-operative learning techniques in language-arts classes resulted in greater language-arts achievement.
- There was a slight but insignificant improvement in social studies achievement in favour of those taught via co-operative learning instructions.
- A slight but insignificant difference was found in the academic achievements of elementary school students due to goal structures.
- Co-operative learning significantly helped minority (black, Hispanic, and handicapped) students.
- Individualistic goal structures combined with mastery learning were more effective in increasing academic achievement than co-operative learning methods.

Ellis's study is limited, however, in that it did not address all the subjects taught in schools; in particular, it did not cover science, with which the present study is concerned. The key point here is that if co-operative learning has a positive effect on subjects such as reading and mathematics, it is possible that it may work for science subjects.

Slavin (1983) conducted a review of research on the achievement effect of co-operative learning instructional methods in which pupils work in small groups to master academic materials. The review focused only on studies (a) which had a field experiment of at least two weeks' duration in regular primary and secondary schools; (b) which compared treatment against control group (this requirement excluded a very small number of studies that failed to use control groups); and (c) in which the

achievement measurement was given to both treatment and control groups after the group experience. The result of Slavin's review supported the following conclusions:

- Co-operative learning methods that use group rewards and individual accountability consistently increase student achievement more than control methods in many academic subjects in elementary and secondary classrooms.

- Co-operative learning methods that use group study but not group rewards for individual learning do not increase student achievement more than control methods; there is no evidence that studying in groups per se is more or less effective than studying individually. The effects of group study depend entirely on the incentive structure used.

- Co-operative learning methods that use task specialisation and group rewards (however defined) apparently increase student achievement more than control methods, but methods that use task specialisation and individual rewards do not have this effect. However, because the number of task specialisation studies is small, more research of this kind will be needed before firm conclusions can be drawn. (p. 433)

The conclusions reached by the above meta-analysis should be viewed with caution, owing to a number of methodological considerations. Gay (1992) suggested that there are two major problems associated with meta-analyses and reviews. The first is the level of subjectivity involved. Different researchers use different criteria for selecting studies, and different strategies of review, and accordingly often come to different conclusions. The second problem is that, as the number of studies available for reviewing increases over time, so does the difficulty of the reviewing task.

Another issue raised by the researchers in implementing co-operative learning is pupils' behaviour and perceptions in the groups and how different pupils respond to group processes. King (1993) pointed out that studies of pupils' perceptions during co-operative learning have proven a helpful line of inquiry in the study of teaching. He adds that, although a large body of research exists on pupils' outcomes from such learning instruction, less is known about pupils' behaviour and perceptions during lessons where such teaching techniques are used. King (1993) investigated the high

and low achievers' perceptions of co-operative learning in two small groups. The study focused on the processes of eight American third-graders who were learning mathematics in a small-group co-operative learning method called 'groups-of-four'. Two groups were studied, each consisting of two high-achieving and two low-achieving pupils. The data was obtained throughout four mathematics lessons in a single classroom. Both observation and interviews were used to collect the data, and the data then examined in relation to the research questions. The questions were as follows:

1. What kinds of learning and information processing occur among low achievers during small-group co-operative learning?

2. What are the nature and degree of co-operation among low achievers during small-group co-operative learning?

The study concluded that, although the low achievers were active in the learning processes, the co-operative learning technique did not greatly reduce the differential status effects between the high and low achievers. The high-achieving pupils assumed dominant roles during the group processes to complete the task, and in the quantity and quality of their contributions to group efforts.

Webb (1989) claims that giving help and explanations during small group work is positively related to achievement. She also suggests that high-achieving pupils are the main sources of help and explanations in mixed ability groups. Bennett and Dunne (1992) point out that many teachers as well as parents seem to express concern about the benefits high achievers derive from helping other children. Webb (1989) suggests that in order to explain something to someone else, the helper must clarify, arrange, and possibly rearrange the assigned materials. During these processes the helper might

discover problems relating to his or her own understanding. To resolve these problems the helper may search for new information to clarify the misunderstanding, thereby learning the materials better than before. Furthermore, Webb suggests that when an explanation given to a groupmate is not successful, the helper is obliged to try to reformulate the explanation using different language, generating new examples, linking examples to the target pupils' prior knowledge, and using alternative symbolic representations of the same materials such as pictures vs. diagrams vs. words. Taking these activities as a whole would be likely to expand the helper's understanding of the assigned materials.

Johnson *et al.* (1976) argue that students' attitudes towards learning have important effects on behaviour, but that these have yet to be studied thoroughly. One major element affecting discipline in the classroom is the length of time students spend on task, because time on task tends to reduce negative behaviour. As Slavin (1983, 1991) found, co-operative learning increases the time spent on task because of the social nature of the co-operative task itself. Also, as Johnson and Johnson (1991) argue, group members can help with a disruptive student if a teacher trains them in procedures that control the disruptive student, and also trains the class in collaborative skills. Moreover, the proper use of co-operative learning instruction, in conjunction with competitive and individualised goal structures, will prevent most discipline problems from ever happening, or at least reduce inappropriate, non-responsive and obstructive behaviours in the classroom.

Although many of the US studies have been highly successful, disagreement is apparent among researchers concerning the conditions under which co-operative learning structures enhance performance. Even Slavin (1993) realised that there was disagreement here:

> After hundreds of studies of cooperative learning and achievement over the past twenty years there is still a great deal we do not know about how cooperative learning operates in inceasing student achievement and what forms of cooperative learning are most likely to be effective. (p. 24)

Mandel (1991) acknowledges the force of this argument, stressing that a number of problems have recently occurred during the analysis of co-operative learning research and implementation. He notes three major problems:

1. Most of the research carried out to date has involved a specific co-operative learning structure. This is not the case in most schools using co-operative learning.

2. Many teachers are not sufficiently trained in implementing co-operative learning strategies.

3. Most of the research has focused on the effect of the structures, not on the interactions which occur in their use.

After conducting an in-depth investigation of the inner components of co-operative learning methodologies, he reached the following conclusions:

1. There is a direct correlation between the teacher's focusing on questions and interaction with students during co-operative learning settings and subsequent critical thinking behaviour on the part of students.

2. It is not so much that co-operative learning groups affect students' leadership roles and communication patterns, but rather that student leadership styles and subsequent communication patterns affect co-operative learning groups.

3. During individual task assignments, the nature of the interaction that the students show among themselves directly correlates with their leadership style.

4. The same students who show co-operative personality traits in co-operative learning also show the same personality traits when given any opportunity to work co-operatively. Co-operative learning did not appear to cause the co-operative working behaviour observed in the pupils' studies.

5. Co-operative learning affects pupils' behaviour to the extent that pupils are able to function at the level expected of them.

At this stage it should be noted that there are inconsistencies in the studies reviewed above. For example, some of these studies found that co-operative learning structures produce the best performance, whereas others found that competitive or individualistic structures are as effective or better. There seems to be disagreement among researchers as to the conditions under which co-operative learning structures enhance pupil performance. Another concern raised by US studies is that of pupils' behaviour during groupwork. For example, do high and low achievers differ in their response to group processes? Moreover, does pupils' behaviour depend on the type of task and the number of pupils in the group? All these questions have yet to be researched. The present study will explore some data regarding pupils' behaviour in groups through teachers' diaries and observations.

4.7.1.2 Co-operative learning in the United Kingdom

Kutnick and Rogers (1994) claim that current use of co-operative learning in the United Kingdom is often linked with the publication of the Plowden Report (CACE, 1967). They summarise the Plowden recommendations as follows:

> small groups should be used to increase teacher efficiency – pupils working in small groups would free the teacher to help individual pupils with problems; group work would allow pupils to recognise and work with the strengths of others; pupils within a group could help each other; explanations that pupils provide for one another would help to increase their learning; and group discussion would help pupils in their planning and discussion skills. (p. 4)

Kerry and Sands (1982) uphold the benefits of classroom groups as recommended by the Plowden Report. They maintain that working in groups increases pupils' ability to co-operate, that pupils will be able to learn from each other, and that these groupings will eliminate the fear of failure. Kutnick (1994) describes the current practice of classroom grouping in the United Kingdom as follows:

> Many types of grouping have been in evidence in UK classrooms. Groupings include individualised approaches, small groups of 4 to 8 pupils and whole-class approaches. Research undertaken on these groupings focuses on teaching style, type of small-group learning tasks, and teacher–pupil interaction. Most studies use observational methods rather than structured experiments to gather data. In general, the results show little evidence that teachers structure small groups for reasons other than classroom organisation. There is little or no evidence that particular groups are assigned particular tasks, and little comparative testing between types of grouping. Studies find that teachers use a range of organisational styles with regard to grouping and, unlike in the United States, the government has kept a watchful eye on groupings. (p. 15)

The following reviews include academic studies and reports stemming from UK government inspections. The Social Science Research Council (SSRC) launched a five-year observational study that searched for evidence of teaching and grouping style in the United Kingdom (Galton *et al.*, 1980). The ORACLE (Observational Research and Classroom Learning Evaluation) study of 58 primary and junior classrooms revealed data on how teachers organised their classrooms and the teaching methods they employed. It also showed how pupils responded to different teaching methods. Regarding the use of groups in the classroom, the ORACLE researchers reported the following:

1. Individualistic learning, in which pupils work individually on a task, was the most common practice in the classroom.

2. The whole-class teaching method was far less frequently used in the classroom.

3. Co-operative groupwork was extremely rare, although pupils often sat together around tables in physical groups while engaging in their individual task.

4. A number of small groupings were used, which included individualised seat work and co-operative learning (pupils working as a group on a common topic), but this was done by dividing the task into separate units, with each pupil working individually on one element to complete the task.

5. Pupils did not show a great interest in working together.

The broad conclusion was as follows:

> During the course of the ORACLE survey it became increasingly apparent that although comparatively few teachers practised co-operative groupwork many would like to. There are obvious practical advantages to group work in the prevailing conditions of today's classroom. Mixed ability and vertically grouped classes make whole class teaching increasingly difficult and inappropriate, and larger class sizes place an added strain on the teacher attempting individualised learning. Consequently, there are attractive practical advantages to be gained from group work, if it can be organised in such a way that children become sufficiently self-motivated to accept responsibility for their own learning whilst collaborating in small groups. (Yeomans, 1983, p. 100)

Bennett *et al.* (1984) observed groupings of infant pupils sitting around tables but engaged in individualistic learning. The exchanges among pupils were usually at a low level. When assigned cognitive tasks, or when they completed an assignment, pupils had to depend on the teacher for help. Reliance on the teacher caused some management problems, with many pupils waiting for teacher attention and help at the same time.

Tizard *et al.* (1988) provided evidence of classes being structured into apparent groups while the pupils were nevertheless taught via the traditional method. They found that 65 per cent of all teacher–pupil communications were with the whole class, 17 per cent on a one-to-one basis, and 19 per cent with groups. Ten years after the original ORACLE study, Galton and Williamson (1992) carried out a further investigation, ORACLE 2. Kutnick summarises the findings of this study as follows:

> Approximately two-thirds of the teachers stated that they used groups in their classroom; most pupils were physically grouped by mixed ability friendships; most teacher interactions were with individuals (72 per cent), followed by whole class (19 per cent) and small groups (9 per cent). A majority of teachers stated that they favoured discussions amongst groups with individual pupils' assessments, but the relationship

> between this aim and actual classroom practice was weak. And, most group work did not call for within-group interaction – pupils were unlikely to maintain collaborative efforts if the teacher was not present to direct them towards collaboration. Pupils preferred not to collaborate within groups and this was explained by the lack of desire to take risks in groups. Pupils were unlikely to be supported within the group by positive and helpful feedback from other group members. (p. 17)

The HMI surveys and observational studies provided a considerable amount of data on classroom groups. The 1982 HMI survey claimed that children as young as five could benefit from working with others in small groups to gain social skills and experiences (HMI, 1982). Another survey found that co-operative groups were an essential ingredient of the best mathematics (HMI, 1989a). Similarly, the survey of science teaching (HMI, 1989b) found that the best science work was undertaken by pupils working in small groups. After reviewing a large body of surveys and reports, Kutnick (1994) concluded:

> Overwhelmingly, these survey and observational studies show that teachers use a variety of groupings in class. Small groups are the most likely seating arrangement, while whole-class and individualised grouping is the predominant teaching mode. Teachers, for the most part, do not assign tasks that draw upon small-group capabilities (of co-operation and collaboration) and pupils do not show preferences for working in small groups – in fact, they can find small groups quite threatening. Teachers' use of whole-class and individualised approaches is not confined to particular regions in England or to particular age groups. There is enough survey evidence to show that these approaches probably characterise most primary and secondary schools throughout the country. (p. 17)

Some UK studies adopted the experimental approach, focusing on the outcomes of co-operative learning and the processes taking place within small groups. Wheldall *et al.* (1981) examined the effect of different classroom seating arrangements on pupils' on-task behaviour. They observed two junior classes of ten- to eleven-year-old children. They found that in both classes mean on-task behaviour was lower when children worked in a group around a table than when they worked in traditional rows. In other words, pupils are likely to spend less time on task when sitting in groups than when working in rows.

Boydell (1975) examined the nature of children's behaviour in six informal junior school classrooms. Children were observed using a time sampling procedure, in which the observations were recorded by multiple coding. Boydell found that pupils placed in physical groups often work as individuals to complete the assigned task. She also found that children were predominantly involved in task-related talk, despite the low incidence of teacher contact.

Hall (1995) investigated the perceptions of 123 primary pupils in Kent regarding their experience of a variety of learning methods, focusing in particular on their perceptions of co-operative learning involving discussion in small groups. She examined the link between classroom learning values and perceived enjoyment and pupil satisfaction with the level of provision of these learning approaches. She concluded that children need to be made aware of the purposes of different methods of learning. In particular, they need to understand why they are asked to work with other children in small groups, so that they will value groupwork more highly. Gayford (1993) found that group-discussion-based learning is an effective method of providing students with the opportunity to develop learning skills which have a wide application across the National Curriculum.

Galton and Williamson (1992) suggest that pupils are likely to achieve more if they are encouraged to work co-operatively towards a common goal or if they make an individual contribution to complete a common task. They also claim that mixed ability groups function best. Further, they stress that clarity and practicality regarding the structure of the task are important factors for achieving a high degree of co-operation

among pupils. Also, pupils need to be taught how to co-operate and engage in discussion, so that they are clear about what is expected of them.

Bennett and Cass (1988) conducted a study to compare the effects of three types of groups. The first type contained ability groups of high, average and low achievers. The second type consisted of mixed ability groups containing a high, an average and a low achiever. The third type consisted of mixed groups containing only high and low achievers – one consisting of two high achievers and one low achiever (2HL) and the other two consisting of two low achievers and one high (2LH). All three groups worked on the same task dealing with co-operative decision-making, and all pupils were interviewed individually after the task to examine the level of understanding they showed. Bennett and Dunne (1992) summarised the findings as follows:

> (a) Groups 2LH performed much better than groups 2HL. In the latter combination, the low attainer seemed to be ignored, or to opt out, and as a consequence misunderstood the basis on which decisions were being made, and presented incorrect reasons in the post-task interview.
>
> (b) Ability groups of high attainers significantly and consistently outperformed the groups of average and low attainers. The high ability group was, overall, the best of all nine groups studied. On the other hand, the suggestion from previous research that homogeneous groups of low ability children may not have the relevant skills and knowledge to give effective explanations does gain support. Their level of instructional talk was very low, and of the 155 explanations sampled in this study only five were provided by the low ability group. The frequency of suggestions was also very low, and a proportionately large number of incorrect reasons were noted in the post-task interview. This fairly dismal picture of the processes in the low attaining group is not dissimilar to that found in the average attaining group.
>
> (c) High attaining children performed well, irrespective of the type of group they were in. These children talked more, and more of their talk was instructional in nature. They made the most suggestions, and had the most suggestions accepted. They provided twice as many explanations as other groups, with three-quarters of all explanations falling into the 'correct and appropriate' category. They were also the most successful at giving reasons for the decisions made in the post-task interviews. It is important to record this success of high attainers since there is a fear among many teachers that grouping such children with low attainers adversely affects the high attainer. The two major findings of this study would argue for the obverse of that. (p. 33)

4.7.2 Regional studies

There is only a relatively small body of research relating to the use and effectiveness of co-operative learning in schools in the Middle East, though some studies have been conducted in Kuwait, Jordan and Bahrain. Unfortunately, in the Middle East it is difficult to acquire knowledge about studies conducted in a specific field, because of the lack of databases or networks with which to search for studies. Moreover, using inter-library loans would prove too time-consuming. However, the researcher made an effort to locate studies concerned with the effectiveness of the co-operative learning technique in the Middle East. Several were found, and these are discussed in turn.

Shachar and Sharan (1994) compared the effects of co-operative learning employing the Group Investigation method with the traditional Presentation-Recitation method ordinarily used in most classrooms. The study involved 351 Jewish pupils from Western and Middle Eastern backgrounds, with 197 pupils in five classes being taught for six months with the Group Investigation method, and 154 pupils in four classes being taught with the Presentation-Recitation method. Dependent variables included pupils' academic achievement, their verbal behaviour during 30-minute videotaped discussions, and the nature of their social interaction during the group discussions.

Nine teachers participated in ten workshop sessions held during the course of the year prior to the implementation of the experimental programme of the study. Of these nine teachers, six were to teach with co-operative learning methods and three were to teach with the whole-class method. Two teachers who were to teach with the whole-class method did not participate in the workshop devoted to co-operative learning methods.

The study used structured observation techniques (observation schedules and videotapes) and achievement tests in order to examine the effect of the Group Investigation method and the whole-class method on pupils' performance, as well as verbal and social interaction in the multi-ethnic classroom. The study concluded as follows:

> All students from the Group Investigation method expressed themselves more frequently and used more words per turn of speech than their peers in classrooms taught with the traditional whole-class method. In groups from the whole-class method, Western students dominated the discussion in regard to the number of turns of speech, whereas in groups from classes taught with the Group Investigation method, turn-talking was almost symmetrical among students from the two ethnic groups.
>
> Students from both ethnic groups addressed more co-operative statements to Middle Eastern students after studying in Group Investigation classes than did students from the whole-class method. Finally, students' achievement scores were higher in classes taught with the Group Investigation method than in those taught with the whole-class method, using both aggregated classroom and individual scores. This finding was true for students of both ethnic groups. (p. 313)

Although the concerns of the above study and the present study are different, the former was concerned with the effect of a particular co-operative learning method (Group Investigation) on pupils' verbal and social interaction and academic achievement in the multi-ethnic classroom in geography and history subjects. This study shows that pupils who experienced Investigation expressed themselves more frequently, used more words per turn, and scored higher than their counterparts who were taught with the whole-class method. The question which emerges here is whether co-operative learning would have a similar impact on pupils studying science in Qatari primary schools.

Nouh (1993), in Jordan, investigated the effect of co-operative learning on seventh-grade pupils' achievement in algebra. The primary purpose of the study was to compare the effect of two different approaches to teaching algebra on pupil

achievement. The study sample consisted of 160 female pupils (80 pupils as the experimental group, 80 pupils as the control group). Pupils were assigned to four classrooms, two experimental and two control. An Algebraic Readiness Test was used to assign pupils into mixed ability groups. Pre- and post-achievement tests for both experimental and control group were employed. The experiment lasted for six weeks, two lessons weekly. The teachers in both the experimental and the co-operative groups were student teachers. They were involved in a training programme consisting of two hours' lecturing on the co-operative learning technique, designing lessons using co-operative learning procedures, and teaching four lessons (micro-teaching) prior to implementing co-operative learning.

A t-test was employed to test for differences between the mean rating of the experimental and control groups. The t-test showed that there was a significant difference at $p<0.05$ for the experimental group. The study made the following suggestions:

1. Teachers should be encouraged to use co-operative learning in teaching mathematics in general, and problem-solving in particular.
2. More studies are needed to examine the effect of co-operative learning on pupil achievement, especially in mathematics.
3. More research is needed to investigate group processes and interactions, and social skills, occurring during groupwork.
4. Careful attention should be given to physical arrangements (classrooms, resources, lesson planning) before co-operative learning is implemented.

This study is closely related to the present study, in that both studies examine the effect of co-operative learning on pupil performance. However, Nouh's study is limited in that it used inexperienced teachers (student teachers) to implement a highly

structured technique. Moreover, a training programme consisting of two hours' lecturing and the designing of a few lessons is not enough to qualify student teachers to implement co-operative learning. There are other skills to master and discuss, such as the role of the teachers in the classroom and classroom management. Further, the study did not reflect on teachers' perceptions, pupils' attitudes and behaviour during the training programme, or the implementation of co-operative learning. However, since co-operative learning techniques have only recently been introduced to the Middle East, this study was necessarily exploratory in nature.

Dumiati (1992), in Saudi Arabia, investigated the effect of co-operative learning on third-year college students' achievement, and retention of information in social science, comparing it against traditional teaching methods. A sample of 34 female students majoring in social studies was divided equally and the students assigned randomly into two groups (experimental and control). An achievement test was given to both groups as pre-, post- and postponed tests. The study lasted for four weeks, one session per week. The researcher herself taught both experimental and control groups. A t-test was used to test for differences between the mean rating of experimental and control groups. The study reported that there was a significant difference at $p<0.01$ for the experimental group. Moreover, students who experienced co-operative learning reported higher retention rates than those taught by traditional methods (86% as against 76%). Dumiati's study made the following suggestions:

1. Since the study sample was small, studies on a large scale should be carried out to corroborate the results of the smaller study.

2. Studies on different levels, investigating different factors, such as motivation, sex and performance, are needed.

3. Teachers should be trained to use new teaching methods in the classroom to improve learning processes.

The study should be viewed with caution because of the limited sample and the fact that the researcher was the teacher in both the experimental and the control groups. Moreover, some potentially important factors were ignored in this study, such as student interaction and behaviour during groupwork, and the difficulties teachers may have encountered in implementing co-operative learning.

Qa'ud (1995) conducted a study to discover the effect of co-operative learning on tenth-grade pupils' achievement and self-concept in geography. It addressed the following questions:

1. Is there any difference in tenth-grade achievement in geography between pupils taught by co-operative learning and pupils taught by traditional teaching methods?

2. Do teaching methods (co-operative, traditional) have an effect on pupils' self-concept?

A sample of 41 male pupils participated in the study, the population of two established classrooms. One classroom was considered as an experimental group, while the other was used as the control group. A particular teacher was selected to teach both groups, because he was interested in implementing co-operative learning in classrooms. The teacher was trained for five hours to use co-operative learning in practice. A measurement of self-concept by Sawalha (1990) and an achievement test were administered before and after the experiment. The study lasted for eight lessons for each group; the pupils were taught a unit from the tenth-grade geography textbook.

The above study reported that a t-test showed no significant difference between the mean rating of the experimental and control groups. However, use of the one-way MANCOVA resulted in a significant difference between the control and experimental groups in terms of achievement at level $p<0.05$, while there were no significant differences in the post-self-concept test. The study provided several explanations for why the experimental group outperformed the control group:

1. Interaction and co-operation among pupils in the groups helped to improve performance.

2. The group learning experiment increased pupils' motivation.

3. Evaluating both individual performance and group products helped to increase achievement.

4. Assigning pupils to mixed ability groups had a positive effect on pupil achievement, especially for low achievers.

5. The fact that each pupil was responsible for learning, discussing, observing, reading and producing ideas helped to increase pupil achievement.

Qa'ud (1995) made the following recommendations:

1. In teaching geography, teachers should use co-operative learning alongside other teaching methods.

2. Geography teachers should be trained to use co-operative learning.

3. Large-scale studies are needed to investigate the effect of co-operative learning on self-concept.

Although Qa'ud's study found a significant difference in achievement for the experimental group, the study should be viewed with caution owing to a number of limitations: the size of the sample (20 pupils in the experimental group and 21 in the control group); the teacher's training programme (only five hours of training); and the insufficient time allowed for investigating the effect of co-operative learning on a

psychological factor (self-concept). Moreover, the study offered a number of reasons for why the experimental group outperformed the control group, including that it exhibited more enjoyment, motivation, interaction, and sense of responsibility, without using any data collection methods such as questionnaires or observation to support the claim. However, as the researcher pointed out, his study aimed only to explore the broad potential of co-operative learning in Jordan.

Aba-bna (1995) conducted a study to investigate the relative effects of co-operative (Jigsaw) learning, Learning Together and traditional methods of learning on the attitudes of seventh-grade mathematics pupils. The sample of the study consisted of 87 seventh-grade students from a boys' school in Jordan, enrolled in three sections. The three sections were randomly assigned to one of the three treatments: Jigsaw, Learning Together or Control (traditional learning). The three sections were exposed to an identical mathematics content for thirteen classes. One teacher taught all three sections, and was trained through his teaching two micro-teaching lessons. He was already familiar with co-operative learning through his having participated in several workshops offered by the Ministry of Education in Jordan. The result of ANCOVA revealed that there were no significant differences on the attitudes of the mathematics students on the post-test. Also, the change in attitude for each section at the end of the experiment was not significant.

Although the concerns of Aba-bna's study and the present study are not identical, the former is concerned with the effect of two particular co-operative learning techniques on pupils' attitudes towards the learning of mathematics. This study shows that

increasing attention is being given in the Middle East to co-operative learning techniques. For example, it points out that the Ministry of Education in Jordan is adapting co-operative learning techniques and offering training programmes and workshops for teachers. Moreover, it suggests that more studies are needed to examine the effectiveness of co-operative learning on pupils' attitudes. Al-Faleh (1981) conducted a study to examine the effect of lecture demonstration and small-group teaching methods on Saudi Arabian chemistry pupils' achievement and attitudes towards science learning. The sample of the study consisted of 84 eleventh-grade male high-school pupils. The subjects were randomly assigned into two groups. One of the groups was then assigned randomly to the lecture demonstration, and the other group assigned to the small-group experimentation. The two groups were pre-tested, and the results showed that they were significantly different ($p<0.05$) regarding either achievement in chemistry or attitudes towards science. Al-Faleh's study reached these conclusions:

1. There were significant differences between the lecture demonstration and small-group experimentation groups on the chemistry achievement on both immediate and delayed measures. The small-group experimentations evidenced greater achievement than the lecture demonstration.

2. The postponed test found significant differences between the two groups regarding attitudes towards science.

Al-Faleh suggested that further studies, involving a larger sample, using various science curricula such as biology and physics, and different grade levels from elementary to high-school, and considering different variables such as sex, are needed to provide more information about the usefulness of co-operative learning in schools. Moreover, he suggested that teachers should be given adequate training in the use of small-group experimentation:

> The science teacher should be encouraged to seek and develop an understanding of small-group instruction in order to provide valuable small-group instruction. (p. 73)

He also suggested that the science laboratory should be designed to facilitate small-group learning in terms of space, equipment and tools.

Al-Faleh's study shares common ground with the present study, in that both studies examined the effect of co-operative learning on pupils' achievement in a similar cultural setting and similar education systems. Although Al-Faleh's study was conducted in high schools in Saudi Arabia, it provides valuable information regarding the practicality of using co-operative learning techniques in Qatar.

4.8 Summary

It may be concluded from the above literature review that the researchers have gained an awareness of the problems they were addressing and have been able to investigate the links between the co-operative learning method and pupil performance. None of these studies, however, has directly addressed the context in which the present study took place. Also, most of the studies reviewed on classroom groupings in the United Kingdom, the United States and the Middle East indicate that co-operative learning is often used as an organisational device and a physical arrangement rather than being designed to promote the learning of pupils (Kutnick, 1994).

The most important conclusion, however, is that the US research differs from the British, in two ways. First, it attempts to be more experimental, with the use of control groups very common, whereas British research consists of observation and

descriptions of existing practice (Yeomans, 1983). Secondly, the US studies focus on comparing different co-operative learning techniques in terms of outcomes (outcome-oriented), whereas the British studies focus on the processes of learning and the types of interaction going on in the groups (process-oriented).

Bennett (1994) explains that, in the United States, didactic teaching is the norm. Therefore US studies have been concerned with implementing experimental programmes which can contribute to changing the social context of learning in the classroom. In Britain, on the other hand, where the small group is the norm, research effort has been concerned with improving praxis, addressing especially the large amount of off-task interactions and poor-quality on-task interaction. Bennett suggests that these differences have been reflected in research design:

> Differences in the aims of these research studies are reflected in their design. The American and Israeli studies have tended to be input–output evaluations of grouping models, designed to ascertain their effectiveness, rather than to ascertain how groups work effectively. Group processes were largely ignored, even though these processes may have been 'planned' theoretically. The British, and some later American, studies on the other hand have tended to focus on processes. (p. 57)

Although the Middle Eastern studies report the superiority of co-operative learning as against traditional teaching methods, they fail to take into account cultural considerations, and do not report the difficulties encountered by teachers, pupils and researcher in the implementation of co-operative learning in classrooms. Moreover, they simply copy the US method of investigating the feasibility and effectiveness of co-operative learning.

As can be seen, the literature reviewed above has not answered the original questions posed by this study (see Chapter 1). Moreover, Middle Eastern studies have failed to

take into account cultural considerations or the essential conditions for co-operative learning, factors which will therefore be discussed in Chapter 5.

The fundamental questions which emerge from chapter 4 are as follows:

1. What are the advantages and limitations of existing teaching methods as perceived by Qatari primary schools science teachers?

2. Are there any differences in science achievement scores between pupils who experience co-operative learning and those who do not?

3. Does co-operative learning have a differential impact on the achievement level of pupils with high and low prior knowledge?

Chapter 5

Essential Conditions for Co-operative Learning in Islamic and Qatari Cultures

5.1 Introduction

Despite the generally positive outcomes of co-operative learning, researchers and reviewers have identified several problems connected with, as well as essential conditions for, the successful implementation of co-operative learning in the classroom, such as appropriate materials, suitable teacher training, and effective evaluation (Cohen, 1992; Holubec, 1992; Johnson and Johnson, 1992). Moreover, there are a number of cultural considerations which need to be identified before co-operative learning methods are taken on board in Qatari primary schools. This chapter discusses these essential conditions, with particular reference to cultural orientation, and with specific reference to Qatar.

5.2 Essential conditions for co-operative learning

This section discusses the necessary conditions for co-operative learning. These conditions include curricula and materials, teacher training, elimination of behavioural problems, assessment, and provision of support by colleagues and school administrators.

5.2.1 Curricula and resources

Cohen (1992) points out that the use of small-group instruction will probably require a great variety of instructional materials. Some researchers have developed elaborate instructional materials, while others advise teachers to work together to develop and produce these. Cohen remarks that there is:

> a real danger, it would seem, of failing to give teachers the help they need with curricula materials. They have little time, resources, or preparation for the development of such materials. With routine materials one would predict that students would rather quickly tire of working in small groups. Thus the failure to solve the problem of materials may be one of the causes of the rapid decline of this innovation. Once teachers have had the opportunity to work with well-constructed materials, they may well be able to adapt materials on hand. This is especially true for subject matter specialists who tend to collect materials over their years of teaching that can quite easily be adapted. (p. 64)

Further, Good *et al.* (1989–90) indicate that having curriculum materials designed explicitly for small groups is extremely important for the effective functioning of work-groups. They add that most textbooks are designed for students to work with individually. Such materials encourage students to work alone and this discourages social interaction among students. Galton (1981) points out that in order for practitioners to implement groupwork successfully, there is a need for further curriculum guidelines or policy statements.

It appears, then, that appropriate curricula and resources are among the key requirements for the success of co-operative learning. A UNESCO report (1990) points out that, in general, curricula in Qatari schools are characterised by content that is both too condensed and full of topics which are irrelevant to the Qatari context. Moreover, the report indicates that schools do not seem to give attention to providing teachers with the resources they need, including laboratories. Further, the Educational Technology Department, which is supposed to provide schools with resources and

materials, is not performing this role adequately. This department needs to be evaluated in order to identify its shortcomings and to devise an effective strategy for supplying schools with what they need on a regular basis, and for coping with the development and improvement of curricula. The report further points out that there are some schools in Qatar without laboratories, because the schools have converted them to classrooms in order to cope with large numbers of pupils. Those laboratories which do exist tend to be badly equipped.

Kamal (1990) points out that the present curriculum in Qatari schools is concerned with achieving goals and objectives provided by the Ministry of Education and is 'characterised by a selection of content that is dependent upon a single textbook for any given topic, an over-reliance on lectures as a method of instruction and evaluation based on memorisation of facts and on mandatory examinations' (p. 26). This statement clearly shows that curriculum development, methods of instruction and evaluation are in the hands of the Ministry of Education. Practitioners and students are excluded from the curriculum planning process and any instructional materials related to it. It is therefore difficult for teachers to implement new teaching techniques which require modifications in curricula or additional instructional materials without the permission of the Ministry of Education. Hameed (1981) points out that teachers in Qatari schools are not allowed to modify curricula; the only planning role teachers may play in the school is to distribute the lessons throughout the school year.

After evaluating the educational system in Qatar, the UNESCO Report (1990) made a number of suggestions for improving the curricula and educational resources. The

report stresses that teachers, parents and educationalists should adopt a major role in planning and improving the curricula. Curricula should be reviewed to eliminate both repetitiveness and over-compression, and adequate educational materials and resources should be available so that teachers can teach effectively.

In the light of the above, it seems that any attempt to improve existing practices in Qatari schools should begin at the level of the Ministry of Education, otherwise failure is bound to result. It is clear also that the issue of curriculum materials is of critical importance. Cohen (1992) points out that teachers are often highly enthusiastic about co-operative learning when there are well-rehearsed tasks for them to adopt with groups and well-prepared instructional materials for them to use.

5.2.2 Teacher training in connection with co-operative learning

Another problem with the implementation of co-operative learning is the role of teachers and their preparation for carrying it out. In co-operative learning instruction teachers are expected to assume roles which differ from those performed in traditional situations. Teachers need appropriate training and preparation to be able to carry out these roles in co-operative learning. All the findings tend to emphasise the considerable skill teachers need in setting up groups in which children 'learn to get along together, to help one another and realise their own strengths and weaknesses' (Plowden Report, para 757). Thus Galton (1981) writes:

> Urgent research is required not *only* to explore the perceptions of teachers and the nature of group working, but also to observe and identify the best of existing practices as models for future in-service and initial training. (p. 180)

Similarly, Johnson and Johnson (1992) state that teachers need to master certain skills and elements of co-operation before any implementation of co-operative learning, for at least two reasons. First, they need to modify co-operative learning to suit their unique instructional needs, circumstances, curricula, subject areas, and students. Secondly, they need to solve the problems students may have in working together in co-operative situations to increase the effectiveness of the students' learning group. These tasks are not easy to accomplish without appropriate training and preparation.

Further, Cohen (1992) realises that co-operative learning instruction creates a complex environment. He holds that implementation of co-operative learning requires teachers to cope with a situation that is relatively complex: instead of the whole class working on the same task individually, there may be as many as six or seven groups working at their own pace, and in some cases each group is assigned a different task.

Holubec (1992), also, stresses that teachers need suitable training and preparation if they are to take responsibility for adopting co-operative learning. She illustrates this point as follows:

> Often teachers jump into co-operative learning and find the waters are much deeper than expected. Then students complain, refuse to work, copy rather than work, and socialise. As the teachers struggle back to shore, they may decide that staying on the bank is better than the possibility of going under. What they may not realise is that there is another way of getting started with co-operative learning. Just as they did not learn to swim by jumping into deep water, they and their students probably will not learn co-operative leaning by jumping headlong into it. (p. 181)

Kutnick and Rogers (1994) suggest that it is not only teachers who need training and preparation for co-operative learning; pupils also need to be trained to be familiar with co-operative learning and its components before engaging in it in the classroom:

> Use of groups will depend on many factors. If the teachers and pupils have positive experiences of group work, they will participate ... Many students of small groups find that they must have time to prove their effectiveness; small groups rarely work effectively the first time. These studies suggest that training of pupils for group work is necessary ... Teachers must be in a position to provide and support group skills ... Without training for effective group work, there is only a limited likelihood that work in small groups will be successful. (pp. 8–9)

Bennett and Dunne (1990) suggest that pupils should be trained to use the skills of listening, helping, questioning, challenging and providing explanations to peers.

Al-Jalal (1984) states that if a satisfactory future is to be provided for education in Qatar, there is no area in which action is more urgently needed than the reform of teacher training. Al-Atari (1989) indicates that a large number of primary school teachers in Qatar are not qualified because they have not received appropriate training; they are completely unprepared to assume all the responsibilities expected of them. Even teachers who have received professional training need urgent help in order to improve their skills and to achieve further professional growth.

Implementing new teaching techniques can be very difficult, and this is especially true of co-operative learning. Bawazeer (1979) points out that teachers admit they use pedagogically undesirable teaching methods because they work for their students: they elicit good behaviour and satisfactory performance on their own terms. Even if teachers in Qatar agreed to implement new teaching methods they would not be able to do so, because of the shortage of skills necessary to implement new techniques of instruction. Kamal (1990) describes the difficulty as follows:

> Without adequate preparation in teacher education programs functioning in a school environment that stresses strict discipline, memorisation, and drill, the teacher is seldom able to apply methods that deviate from the traditional lecture approach. (p. 57)

It should be clear from the above that teachers in Qatar need an intense programme of systematic training if they are to implement new teaching strategies, while pupils also need to be familiarised with co-operative learning before any implementation of it takes place in classrooms.

5.2.3 Behavioural problems associated with co-operative learning

Researchers and reviewers of co-operative learning have reported a number of disciplinary and other problems associated with co-operative learning. The major problems students experience in the small-group approach, synthesised from several sources (Ellis and Whalen, 1992; Galvin *et al.*, 1994; Good *et al.*, 1989–90; Johnson and Johnson, 1987), include the following:

- Some students are simply not comfortable with the idea of group participation and prefer to work alone.
- Conflict can occur among group members.
- Some students must always win.
- Some students lack motivation.
- There may be too much noise in the classroom.
- Some groups finish early, thus leaving themselves unoccupied.
- Some groups finish last, and these require greater assistance.
- Students do not participate equally.
- Some students cannot keep up.
- Some students display verbal aggression.
- Some students display physical aggression.
- Some students are regularly out of their seats.

All these problems have been explored in the studies mentioned above. For example, Galvin *et al* (1994) report some pattern behaviour problems which were recorded at Prospect Primary School in the UK. They describe this school as follows:

> Prospect Primary is an inner-city 5–11 primary school in an ethnically mixed community. It has 420 pupils on roll of which only 20% live in owner-occupied homes. The school has 20 teachers altogether, including the headteacher. Of these, 14 are class teachers (with two class groups in each year), one is a nursery teacher and four (including the deputy head) are used for support, being spread fairly evenly across the school. The school is open-plan, of early 1970s design and has a tradition of innovation. (p. 92)

A group of school staff participated in gathering data about pupils' behaviour in different school situations. The group designed an 'incident' record sheet for recording the kind of data that are needed for this study. Table 5.1 is an overall matrix of the pattern of behaviour problems recorded at Prospect Primary School.

Table 5.1 Patterns of behaviour problems in schools

Behaviour categories	Move-ment	Activity change	Group-work	Individual work	Teacher talk	Play-ground	Line-up	Dinner	Total
Physical aggression to peers	3	4	4	2	–	11	–	4	28
Physical aggression to staff	–	–	–	–	–	2	–	–	2
Verbal aggression to peers	4	7	9	5	2	14	8	8	57
Verbal aggression to staff	–	1	2	3	1	2	–	8	17
Inattention to task	–	–	8	2	7	–	–	–	17
Destruction of property	3	1	1	–	–	6	1	–	12
Out of seat	–	–	11	6	1	–	–	8	26
Total	10	13	35	18	11	35	9	28	159

(Source: Galvin *et al.*, 1994, p. 95.)

We are only concerned with the first five situations in the table (movement, activity change, groupwork, individual work and teacher talk), because they occur during the course of classroom teaching. It is clear from the table that the main problems in schools involve verbal aggression shown to peers, and this occurs most frequently in the playground and during groupwork. Galvin *et al.* report that 22 per cent of behavioural problems in classrooms happen during groupwork in class. By contrast, 11 per cent, 8 per cent and 6 per cent occur during individual work, activity change and movement respectively. This suggests that negative behaviour is more likely to occur in groupwork than in other situations in the classroom (individual work, activity change and movement). However, Galvin *et al.* affirm that the majority of these problems are relatively low-key, arguing that:

> dealing with the verbal aggression to peers and out-of-seat behaviour would also eliminate a lot of the physical and verbal aggression towards staff, especially as there would be a reduction in the need for staff to reprimand pupils. (p. 96)

Further, they suggest that by strengthening the system of supervision and control at unstructured times and by carefully structuring the tasks for groupwork, almost two in three of the behavioural problems occurring in school could be prevented or reduced.

In Qatari schools, pupils are not used to being active learners, because they are taught in a relatively passive environment. Massialess and Jarrar (1983) point out that pupils participate and contribute only when they are asked to answer questions or read from the textbook. Moreover, pupils tend to be seated in rows in overcrowded classrooms, an arrangement which does not encourage student–student interaction. In any traditional classroom there are students who are used to traditional teaching

instruction and do not want to change, with the result that they sometimes resist any innovation from teachers, as Johnson and Johnson (1987) indicate:

> Within most traditional classrooms there are students who are resistant to teacher influence, unmotivated to learn what is being taught, non-responsive to the usual rewards teachers have to offer for appropriate behaviour, and inappropriately aggressive, hostile, obstructive, irritating and disobedient. (p. 165)

No research has been conducted in Qatari classrooms to confirm the above statement. However, this study will report on students' behaviour in co-operative learning classrooms.

If a school decides to establish co-operative learning groups, there are a variety of practical considerations which need to be thought through prior to the implementation of co-operative learning techniques. For instance, Dwiredi (1993) points out that the room in which groupwork is to take place needs to be comfortable and well-appointed, with easy chairs and space to move around if necessary. Another consideration is that, compared to whole-class instruction, co-operative learning requires more preparation and instruction time. Dwiredi stresses that both situational barriers, such as time and location, and psychological barriers, such as resistance to the idea of participating in small groups, need to be taken into account prior to the implementation of co-operative learning.

5.2.4 Assessment in co-operative learning

Assessing the extent to which pupils have achieved instructional objectives is one of the major issues which concern teachers. As Johnson and Johnson (1987) indicate, in this respect co-operative learning requires approaches different from those which apply in traditional classrooms. They argue that the assessment of pupils should not be

based only on how well pupils have learned the assigned concepts and taken in information, but should also evaluate the effectiveness of the group as a whole. Cohen (1992) argues similarly:

> Teachers often attempt to assess the individual's contribution to the group by observing how the individual members participate in the course of the group work. Given what is known about status problems within the co-operative learning setting, this is an illegitimate mode of assessment. Low-status individuals are frequently ignored when they make contributions and are often shut out of interaction and access to materials. It would hardly seem fair to hold the victim responsible for such failure to participate. In contrast teachers sometimes assess the group as a whole for how well they work together; or may ask groups to assess their own group process. Such assessment can be very effective in improving group functioning. (p.67)

Johnson and Johnson (1987) hold that assessment of group processes should focus both on pupils' contributions to each other's learning and on the maintenance of effective working relationships among group members. In Qatar, this type of assessment hardly exists. Tolefat (1983) points out that evaluation in Qatari schools is characterised by the use of essay texts to assess student achievement. These tests mainly measure verbal knowledge and memorisation, while ignoring other domains of learning such as skills and abilities.

Kutnick and Rogers (1994) indicate that teachers often find assessment in co-operative learning a rather difficult task, because they need to be able to assess the whole group while identifying individual contributions in any group product. UNESCO experts who have studied the assessment system in Qatari schools report (UNESCO, 1990) that examinations in Qatari schools are content-oriented and focus mainly on the pupil's memory. They suggest that a variety of techniques should be used to assess both pupils' ability to learn and their mastery of a given subject. These techniques should pay close attention to the higher cognitive abilities and skills.

In the light of the above, it can be seen that implementing co-operative learning in Qatari schools is not an easy task, while assessing co-operative learning processes and outcomes is even more difficult.

5.3 Cultural orientation

'Islam', Sarwar (1987) states, 'is a complete way of life':

> It is the guidance provided by Allah, the creator of the Universe, for all mankind. It covers all things people do in their lifetime. Islam tells us the purpose of our creation, our final destiny, and our place among other creatures. It shows us the best way to conduct our private, social, political, economic, moral and spiritual affairs of life. (p. 13)

Taking this point of departure it may be held that Islam has organised social life on the basis of a balance between the individual and the community. Islam confers on a person his or her rights and explains his or her obligations. It also gives a community its rights and makes clear its duties. This view is emphasised by Al-Tamimi and Samrin (1985). They mention that Islam considers both individuals and groups at the same time. A good or evil thing which affects a community affects individuals as well, and vice versa:

> It is vital for education to make efforts to develop man's sense of his individuality and to promote his feeling of affiliation to the community in the formative years of his life. If such a feeling or sense appears early it will produce a clear complementarity between individualism and collectivity. (p. 126)

This indicates that Islam supports the idea of collectivity. It fosters a collective attitude, and makes this an obligation within the context of Islamic creeds, principles, rules and instructions. The Prophet [peace be upon him] says:

> Allah's hand is with a group.

Among the main features of a group, according to Islamic principles as they have been defined by Al-Tamimi and Samrin (1985), are mercy and co-operation in various areas of life. The Prophet [peace be upon him] has said:

> The Muslims, in their mutual love, kindness and compassion, are like the human body. When one of its parts is in agony the entire body feels the pain, both in sleeplessness and fever.

Abu-Zahrah (1967) expands upon this teaching, arguing that moral relations, which are based on cordiality and mercy, constitute a basis upon which human communities are established. This sort of relationship connects persons with each other. He says also that rules in Islam are erected on a basis of encouraging individuals to associate and groups to be on intimate terms with each other. A number of educators have called for the socialisation of individuals according to this Islamic point of view regarding the importance of the individual and the group, and the vitality of co-operation and solidarity between them (Al-Dusuqi, 1986; Al-Tamimi and Samrin, 1985). Al-Dusuqi states that the strategic goal of Islamic education is to develop a person until he reaches a state in which he will be a Muslim in belief and behaviour, mastering his job according to modern methods and surrendering all aspects of his life to Islam.

There is a strong suggestion in the Sharia that individuals should co-operate with the group. Allah, the Exalted, has said:

> Help ye one another in righteousness and piety, but help ye not one another in sin and rancour. (5:2)

Al-Subai (1979) writes that worship in Islam is based upon the idea of social co-operation between a believer and all people. For example, prayer, which is the second pillar of Islam, is defined by Sarwar (1987) as:

> the five compulsory daily prayers. Salah is offered five times a day individually or in congregation. (p. 42)

Al-Subai (1979) stresses that prayer is designed to make a human being live by co-operative and social principles, from which society as a whole will benefit. For example, when all adults (rich, poor, handicapped, healthy, black or white) gather five times a day in the same place (the mosque) and stand in the same row, shoulder to shoulder, following one leader (the imam), they get to know each other and care for each other even more. People usually greet each other after the prayer and talk about their lives (their happiness, sadness and problems), which deepens the relationship between them and strengthens the social structure of society.

Zakah (poor tax) is another means of moulding the co-operative and social character of the Muslim. Zakah is the third pillar of Islam, and is defined by Sarwar (1987) as follows:

> The Arabic word Zakah means to purify or cleanse. Zakah is to be paid once a year on savings at the rate of two and a half per cent. This rate applies to cash, bank savings and gold and silver jewellery. (p. 74)

Al-Subai (1979) writes that Zakah is considered as the cornerstone which has, for centuries, kept the Islamic community intact, strong and cohesive. Zakah is one of the features of the collective and co-operative spirit which eliminates isolation and absolute solitude. Zakah is a compulsory tax upon every adult Muslim who has savings anywhere in the world. In the past, governments used to collect the Zakah and distribute it to the needy, but now people pay it and distribute it by themselves.

Collective action and co-operation, then, are among the basic principles upon which Islam is founded. These concepts are not unique to Qatari society. Al-Kurdi *et al.* (1985) conclude that in Qatar:

> family life is based on co-operation which initially began with co-operation between women in supervising and administering the house's affairs ... as regards the family's males, they work with each other in grazing, hunting and/or trading. Income is usually common and distributed according to requirements of sustenance by the head of the family. Co-operation and collective spirit are also noted in the fidelity and devotion of each individual in serving the groups' interest regardless of the amount of his production. So, the final result is considered as the collective effort's result. (p. 94)

They argue that this type of relationship has led to the melting of individual personality in the wider group. As a result, relations inside the family have become relations between roles. Each member in a family becomes responsible for the other members' behaviour as well as for his own.

Al-Kurdi *et al.* (1985) have noted that, at the tribal level, when a group expands:

> different types of functions can be clearly distinguished. Specialisation and division of labour occur among various units and collective elements of the tribe. Some of the clans work in agriculture. Some of the clans specialise in different types of agricultural industry and in manufacturing the required tools for hunting, grazing, and agriculture. (p. 94)

Co-operation and interdependence as values and behaviours, then, have shown themselves to be consistent with the principles of Islam and the lifestyles of Qatari people, especially during the pre-oil era. However, it seems that the economic boom during the oil era has led to changes in these social relationships. Al-Kurdi *et al.* (1985) argue that urbanisation has caused modifications in the family structure. The nuclear family, they maintain, is gradually replacing the extended family, and types of familial relationship have been steadily changing in accordance with families' places of residence. They add that the family has paid more attention to educating sons and daughters to obtain higher degrees. This has adversely affected communication between family members. Urbanisation has weakened the co-operation and solidarity which previously characterised community life in Qatar.

There is no evidence that educational institutions, via their curricula and activities, make any effort to strengthen the values of co-operation and joint responsibility. On the contrary, the educational system in Qatar is based on the principle of competition and rivalry. Teaching methods which depend mainly on dictation do not encourage co-operation and interaction. The assessment system is based on measuring who is the best pupil in class. Pupils usually receive certificates in mid-year and at the end of each semester, and these certificates rank pupils according to their educational achievements. Various school activities, sporting, social and cultural, also enhance competition. For example, competitions are organised for writing the best essay, the best story, or the best poem, and for drawing the best painting, etc. Meanwhile, there is no competition worth mentioning which aims at promoting collective activity among pupils, such as common projects which require collective co-operation and a division of labour. Such projects may encourage students to work towards a common goal, which may serve to enhance their collective and common interests.

The nature of the relationship between adults and children in Qatari society may constitute one of the main factors in marginalising the child's role both in school and outside in the wider community. The child, for example, does not usually talk to adults, at least not without clear permission. The child is also forbidden to express his views in an adult's presence. Ziour (1977) claims that parents and adults in the Arab world always expect their children to be obedient and well-behaved; they do not allow their children to disobey, argue with or discuss their instructions. He argues that this attitude can lower children's self-esteem and affect their critical thinking.

This code of obedience also characterises the relationship between the teacher and the pupils in the class. The pupil is obliged to obtain the teacher's permission before speaking. He must also stand up while speaking and not sit down without being asked to do so by the teacher. This type of relationship erects a barrier between teacher and pupil. It should be noted that the language of command is the most common vehicle for the instructions given by the adult to the child. Words of emollience and thanks are very few in such a relationship. Instead most of the adult's commands to a child concentrate on 'do' and 'do not'. The child is expected to obey without expecting appreciation or appraisal.

Recently, some educators have called for more attention to be paid to collective and co-operative action and for the revival of those values of co-operation which are stated in Islamic texts, and which were formerly practised in Arab communities. Al-Tamimi and Samrin (1985), for example, stress the obligation:

> to devise educational curricula which inculcate the spirit of collective responsibility and an obligation to protect the individual from isolation and solitude. It is necessary to encourage the idea of group respect as an educational rule to be fostered in the mentality and conduct of the generations. (pp. 130–1)

In addition, the Arab Education Bureau of the Gulf States has suggested to the educational planners and curriculum designers eighteen objectives which ought to be considered in planning and designing the education system and curricula. These include the following:

- Encouraging and promoting the values of co-operation, solidarity and interdependence and accustoming individuals to the concepts of mercy, compassion, altruism, sacrifice and forgiveness.
- Fostering groupwork and encouraging individuals to contribute positively to the wider group.

These are some of the objectives which form a framework for curriculum planners in the Gulf States. These objectives have been taken into consideration, for example, in the development of the standard science, social studies, mathematics and Arabic language curricula.

5.4 Summary

From the literature reviewed above certain points have emerged:

- Collective activities represent genuine Islamic values, both in principle, and via application through acts of worship and everyday dealings.
- Collective activities are also consistent with Qatari culture, especially as it evolved during the pre-oil era.
- Urbanisation in Qatar, which accompanied the oil boom, resulted in a number of social changes, such as a greater emphasis on the nuclear family and greater independence of livelihood.
- The educational system in Qatar encourages competitive learning. This is evident from teaching and assessment methods as well as from school activities.
- Both pupils and teachers are used to a competitive learning environment, which can be considered one of the characteristics of the Qatari educational system.

The fundamental questions which emerge from the literature reviewed above are these:

1. Can teachers in Qatar who are used to didactic teaching methods be trained to use co-operative learning methods?
2. Are there any cultural, behavioural or resource-related difficulties in implementing co-operative learning in Qatari schools?
3. Can positive perceptions of the experience of co-operative learning be found among primary school pupils in Qatar?
4. Can any measurable benefits of co-operative learning be observed?

Chapter 6, which describes the procedures and methodology the researcher used in gathering data, will seek to answer the above questions.

Chapter 6

Research Instruments and Methods

6.1 Introduction

Although one of the Ministry of Education's main objectives for primary education in Qatar is to 'teach the child respect for discipline, co-operation through group work and the ability to give and take' (Ministry of Education, 1991–2, p. 21), current teaching methods in Qatari primary schools continue to foster competition and do not promote a co-operative learning environment. Nevertheless, co-operative learning strategies have been strongly suggested as an alternative to traditional teaching methods (Johnson and Johnson, 1991). In addition, in America it has been claimed that such techniques have the potential to solve many classroom problems (Slavin, 1989–90). These techniques have not been used or introduced in Qatar. This study aimed at training a group of primary school science teachers to take on board co-operative learning strategies. Further, it aimed to investigate the teachers' perceptions of co-operative learning strategies, evaluate the effectiveness of the training in terms of the observed classroom practice of the teachers concerned and, finally, discuss the students' perceptions of the experience of co-operative learning.

It must be stressed that this was a pilot project which aimed at introducing co-operative learning into the Qatari context. The sample size as regards the number of teachers involved in the study was, therefore, necessarily limited.

6.2 Research questions and methods of investigation

At the end of Chapters 4 and 5 the following research questions were formulated:

1. What are the advantages and limitations of existing teaching methods as perceived by Qatari primary schools science teachers?

2. Can science teachers in Qatar change their teaching methods so as to promote co-operative learning?
3. Can pupils in Qatari primary schools respond positively to co-operative learning?

4. Are there any difficulties in introducing teaching methods which promote co-operative learning in Qatari primary schools in terms of culture, behaviour and resources?

5. Can one find positive perceptions of the experience of co-operative learning among primary school pupils in Qatar?

6. Can one find positive perceptions of co-operative learning among primary school science teachers in Qatar?

7. Are there any differences in science achievement scores between pupils who experience co-operative learning and those who do not?

8. Does co-operative learning have a differential impact on the achievement level of pupils with high and low prior knowledge?

Considering the aims of the study – to obtain data relating to the views of science teachers on co-operative learning, to explore the possibility of introducing co-operative learning in Qatari primary schools, to implement co-operative learning in Qatari primary schools and to evaluate the effects of co-operative learning on pupils' performance, behaviour and perceptions – it was necessary to use both qualitative and quantitative measures to pursue the investigation. For example, questions 2 and 3 were investigated via observation of teachers and pupils during their engagement in co-operative learning. This served to generate data relating to pupils' and teachers' behaviour and interaction occurring during co-operative learning sessions. In addition, assessing pupils' performances using an achievement test after pupils had experienced co-operative

learning helped in examining the effectiveness of teachers and the degree to which pupils benefited from co-operative learning. Questions 5 and 6 were investigated by the questionnaire instrument, because the teacher and pupil samples were too large for other methods, such as interviews, to be feasible.

Questions 1 and 4 were examined on two levels: first, using a questionnaire to cover all science teachers in Qatari primary schools and second, using interviews of teachers who participated in the training programme. This helped to add an in-depth value to the data obtained from the questionnaire. On the other hand, questions 7 and 8 were examined via an achievement test to determine the effectiveness of the experience of co-operative learning on pupil performance.

6.3 Research methodologies and structure of the research

In educational research, there has been a growing interest in using both qualitative and quantitative methods of collecting data to facilitate an understanding of the case under study. Cohen and Manion (1989) stated:

> If one favours the alternative view of social reality which stresses the importance of the subjective experience of individuals in the creation of the social world, then the search for understanding focuses upon different issues and approaches them in different ways ... The approach now takes on a qualitative as well as a quantitative aspect. (p. 8)

In this study, therefore, both qualitative and quantitative techniques were used to answer the research questions. The decision was taken to use both methods of data collection, for two main reasons:

1. To improve the face validity of the collected data.
2. To provide an insight into the phenomena under investigation (i.e. pupils' behaviour in class).

Another way of using both qualitative and quantitative methods to collect data is highlighted by Bogdan and Biklen (1992). They suggest that it is common in educational research to use both methods of collecting data. For example, before designing a questionnaire an open-ended interview can be conducted to identify possible items to include in the questionnaire. Moreover, Warwick (1983) indicates that integrating various methods in collecting data would:

- provide additional categories of data
- improve accuracy in measuring a single phenomenon
- make the findings generalisable

In this study, qualitative and quantitative measures were used to address different issues. For example, an observation schedule was used to gather information relating to pupils' behaviour and interaction during co-operative learning sessions, which would supplement quantitative data with qualitative evidence, while a questionnaire was used to investigate pupils' perceptions of co-operative learning, in order to provide quantitative data. Integrating both methods, qualitative and quantitative, to answer a research question or to study a case can provide a better understanding of the case and give more accurate answers to the research question.

Bulmer and Warwick (1993) point out that using various data collection methods (both qualitative and quantitative) is important, especially in Third World countries. One reason for this is that it can be very hard to locate and find research data in a specific field. A second reason is that, in Third World countries, people are not used to expressing their opinions frankly; they have a tendency to say what the other person wants to hear. Therefore in this study it was thought sensible to use a wide range of data

collection methods to improve the face validity of the data. This, moreover, serves to reduce the effect on both pupils and teachers of cultural influence that might prevent them from giving honest responses. For example, establishing a good relationship with pupils and teachers might lead to the obtaining of more valid data and better co-operation from them in providing data. Bogdan and Biklen (1992) state:

> If you conduct your research in a systematic and vigorous way and develop trust, you soon will become privy to certain information and opinions about which even all insiders might not be aware. (p. 91)

The following measures were used to obtain the data necessary for this study:

1. Quantitative measures:
   (a) a *teachers' questionnaire* was designed to investigate the expectations and perceptions of science teachers in Qatari primary schools regarding co-operative learning;
   (b) *pupils' questionnaires* were used to investigate pupils' perceptions of traditional, co-operative and competitive learning;
   (c) an *achievement test* was used to determine the effect of co-operative learning methods on pupil achievement.

2. Qualitative measures:
   (a) diaries were used to gather information regarding teachers' perspectives on the training programme and on the implementation of co-operative learning in practice;
   (b) focused interviews were conducted with teachers who participated in carrying out and implementing co-operative learning in schools;

(c) observations were used to gather information relating to pupils' and teachers' behaviour and interaction during co-operative learning sessions.

This study was carried out in three related stages. The first stage was concerned with administering a questionnaire on teachers' perceptions of traditional teaching methods and co-operative learning to all male and female science teachers in Qatari primary schools. The second stage involved designing a training programme to promote co-operative learning and training a group of male science teachers to use co-operative learning in practice. The third stage was concerned with implementing co-operative learning in classrooms, and evaluating the outcomes in terms of the children's learning and their perceptions regarding co-operative learning. The following sections present the main stages of this study, the instruments/data for each stage, the sample, and the procedures for gathering data.

6.4 Stage 1

The first objective of Stage 1 was to survey the perception and expectations of male and female science teachers in Qatari primary schools regarding traditional and co-operative teaching methods. The survey was designed to investigate the following questions and sub-questions:

1. How do teachers perceive existing teaching methods? In particular:
   (a) what do they see as the advantages of existing teaching methods?;
   (b) what do they see as the disadvantages of existing teaching methods?;
   (c) to what extent do they use existing teaching methods?

2. Does co-operative learning exist in Qatari primary schools?

3. How do teachers perceive co-operative learning? In particular:
   (a) what do they see as the advantages of co-operative learning?;
   (b) what do they see as the disadvantages of co-operative learning?

4. What are the difficulties in implementing co-operative learning? In particular:
   (a) what are the cultural difficulties?;
   (b) what are the resource-based difficulties?;
   (c) what are the behavioural difficulties?

6.4.1 Selection of instrument and sample

In order to investigate the above questions and sub-questions a questionnaire was designed and sent to a sample of 164 male and female primary school science teachers, representing the whole population of science teachers in public primary schools in the state of Qatar. (Thirteen of these teachers did not return the questionnaire, leaving a final sample size of 151 teachers, 65 male and 86 female.) There were three main reasons for the decision to use a questionnaire for obtaining information from teachers: (1) a representative sample would be too large for other methods, such as interviews, to be feasible; (2) teachers' collaboration in such an exercise is easily obtainable because in Qatar, once you have permission from the Ministry of Education, teachers' collaboration is guaranteed; (3) for cultural reasons female teachers cannot be interviewed by male researchers, and so the questionnaire is the most common method used to question Qatari women if the researcher is male.

6.4.1.1 Nature of the questionnaire

Wiersma (1986) defines the questionnaire as a:

> list of questions or statements to which the individual is asked to respond in writing; the response may range from a checkmark to an extensive written statement. (p. 179)

The questionnaire technique of collecting data is, according to Kemmies and McTaggart (1988), probably the most commonly used method of inquiry. Kemmies and McTaggart describe three types of questionnaire. The first is the mailed questionnaire, in which a prepared list of questions is mailed to the respondents for answering and return. The second type is the group-administered questionnaire, in which a group from the sample concerned is gathered in one place to fill in the questionnaire. The third is the personal contact questionnaire, where the researcher personally contacts the respondents and has them complete the questionnaire.

As a data collection technique, the questionnaire has several advantages and limitations, and these are summarised in Figure 6.1. Nachmias and Nachmias (1987) point out that questions are the foundation of all questionnaires. They proceed to argue that the questionnaire ought to translate the study objectives into specific questions; the answers to these questions should provide the data for testing the research questions. Researchers such as Gay (1992), Slavin (1984b) and McKernan (1991) have provided general guidelines to be taken into consideration when constructing a questionnaire. These researchers suggest that a questionnaire should:

- be as clear and simple as possible
- avoid questions that are too long
- ask only important questions which respondents can answer
- avoid questions with two parts
- follow a natural logic and order
- in multiple choice questions, ensure that all the possibilities are covered

Advantages	Disadvantages
• Easy to administer; quick to fill in	• Analysis is time-consuming
• Easy to follow up	• It is difficult to get a list of good questions together
• Provides direct responses of both factual and attitudinal information	• Some respondents do not answer honestly
• Makes tabulation of responses quite effortless	• Effectiveness depends very much on reading ability and comprehension of the individual
• Provides direct comparison of groups and individuals	• Response rates are often low, due to fear of lack of anonymity
• Appropriate for large samples	• Difficult to get questions that explore in depth
• Data are quantifiable	• Respondents try to produce the 'correct response'

Figure 6.1 Advantages and disadvantages of the questionnaire technique (adapted from Hopkins, 1993, McKernan, 1991 and Gay, 1992)

All these principles were taken into consideration when constructing the questionnaires for this study.

6.4.1.2 Construction of the questionnaire

The covering letter. The covering letter is an important part of any survey involving a questionnaire. It helps to introduce individuals to the questionnaire and motivates them to respond (Wiersma, 1986). The covering letter for the teachers' questionnaire contained a paragraph stating the purpose of the questionnaire and indicating that the responses would be treated anonymously.

Part 1. This outlined the scope of the research, offered a definition of co-operative learning, and provided instructions on how to respond to the different items of the questionnaire. The teachers were told that their co-operation was appreciated and that the data would be anonymous. After the introductory paragraph and instruction, the

respondent was asked eight questions. Questions 1–5 were concerned with personal data such as sex, age, length of experience, nationality and qualifications. Questions 6–8 were concerned with the teacher's methods of teaching in classrooms and the laboratory and with alternative methods teachers like to use in their classrooms.

In this part of the questionnaire, teachers were asked to tick the appropriate box provided or to write answers in the spaces provided. For example, when teachers were asked their sex, two choices were given to them (male/female), and they were asked to tick one of them. However, when teachers were asked what alternative teaching methods they would use in the classroom, they were given three spaces to list their choice of alternatives (Appendix 2).

Part 2. This dealt with teachers' perceptions of traditional and co-operative teaching methods. It contained twelve main items and twenty-six sub-items. For example, question 9 was concerned with the advantages of traditional teaching methods. Under this question there were 14 sub-items for the teachers to rate. Items 9, 10, 11, 12 and 16 dealt with the advantages and disadvantages of traditional teaching methods. Items 13, 14, 17, 19 and 20 dealt with whether co-operative learning practices exist in Qatari primary schools or not. Item 17 dealt with one of the main reasons for the common use of traditional teaching methods. This item was derived from previous literature on science teaching in Qatar.

In this part of the questionnaire, all items were Likert-type questions. Teachers were asked to circle the appropriate response on a four-point scale in terms of the degree of

truth of the statement (definitely true, usually true, usually not true, definitely not true). However, this part also contained items which enabled the teachers to write a response in the spaces provided. It was thought that giving the teachers the opportunity to add new categories would enhance the validity of the items and help them to express their thoughts. For example, item 9 was concerned with the advantages of teachers' existing teaching methods; 14 sub-items were provided for the teachers to tick on a four-point scale. They were, however, provided with three spaces to indicate different advantages they encountered. These new categories were coded and analysed together with the original sub-items (see Appendix 2).

Part 3. This was concerned with what teachers might expect were co-operative learning to be implemented in Qatari primary schools. It contained seven main items and eighteen sub-items. Question 21 dealt with the advantages of co-operative learning, and question 22 was concerned with the disadvantages of co-operative learning. There were 8 and 6 sub-items under questions 21 and 22 respectively. Questions 23, 24 and 25 were concerned with the cultural resources and behavioural difficulties in implementing co-operative learning. Question 26 asked teachers to make comments or add any relevant information not covered in the questionnaire.

In this part of the questionnaire also, all questions were Likert-type questions in which teachers were asked to indicate their response on a four-point scale in terms of a degree of expectation (definitely expected, usually expected, usually not expected, definitely not expected). However, for all questions in this part teachers were given spaces to write new categories and thoughts. The main purpose of giving the teachers such spaces was

to explore their perceptions of co-operative learning. For example, question 12 dealt with the advantages of co-operative learning; teachers were provided with 8 sub-questions to tick on a scale of four. However, they were provided with three spaces to add their own suggestions (see Appendix 2).

6.5 Stage 2

The main objectives of this stage were to design a co-operative learning training programme, and to describe the procedures for evaluating the programme and for training a group of male science teachers to use co-operative learning in schools.

6.5.1 The teacher training programme

This section provides an overview of the training programme. It (1) discusses the logistical arrangements; (2) reviews the programme objectives and content and the instructional materials that were used; and (3) describes the teaching methods used in the presentations.

6.5.1.1 Logistical arrangements

Aronson *et al.* (1978) recommend that, ideally, teachers need around five days' training to reach the point where they can employ a co-operative learning strategy such as Jigsaw skilfully and with confidence. However, they suggest that unfortunately, most in-service training programmes are one-day affairs, and so training objectives must be limited and realistic. In this context they provide an outline for a one-day introductory workshop on the Jigsaw method:

> Minimally, you would try to provide the experiences that would enable the teachers to gain a greater cognitive understanding of the benefit of the occasional use of co-operative strategies, an idea of how these strategies may be implemented, and a beginning notion of how to deal with many of the problems that may arise during the implementation phase. In

> addition, you would want to provide the teachers with an opportunity to experience for themselves teambuilding activities and group processing exercises in order to develop their group dynamics skills. (p. 163)

With this in mind, six workshops were scheduled, each lasting from 8.30 to 12.30 p.m. Requirements for the workshops included a location, facilities and materials, which were arranged and prepared prior to the workshops taking place. Efforts were made to provide the participants with a comfortable, interesting and relaxed learning environment which would set a non-threatening tone for the workshop and reduce participants' stress levels. Careful attention was given to ensuring that the rooms, facilities, equipment and furniture were functional and conducive to effective learning and participation.

For ease of reference, workshop materials were organised in a workshop manual, which enabled the researcher to follow a logical sequence of activities. The manual also contained blank sheets for note-taking, a description of activities, and a timetable for the workshop.

6.5.1.2 Objectives of the training programme

The aim was that by the end of the workshop training (see Appendix 11) teachers would:

1. Be able to identify some of the advantages and limitations of teaching science using traditional methods.
2. Be able to describe and discuss new trends in science teaching in primary schools.
3. Be familiar with the concept of co-operative learning.
4. Be familiar with some of the research on co-operative learning techniques.
5. Know how to implement co-operative learning in classrooms.

6. Be prepared to deal with problems that might arise during the implementation of co-operative learning.

7. Have experienced team building activities and group learning.

6.5.1.3 Outline of the content of the training programme

In order to accomplish the stated goals and objectives (see Appendix 11) the training programme included the following parts:

1. Discussion of traditional teaching methods in the Arab world, with special reference to Qatar. The discussion helped to elucidate:
   (a) the definition of traditional teaching methods;
   (b) the advantages and limitations of traditional teaching methods;
   (c) the reasons why teachers, especially science teachers, use traditional methods in their classrooms.

2. A presentation on new trends in science teaching in primary schools, with particular reference to co-operative learning.

3. A presentation and critical discussion of literature on co-operative learning techniques. The following areas were covered:
   (a) the basic concepts of co-operative learning;
   (b) historical background;
   (c) theoretical background;
   (d) co-operative learning methods;
   (e) effectiveness of co-operative methods;
   (f) general outcomes of co-operative learning techniques.

4. Development of skills necessary for implementing co-operative learning in classrooms. The following aspects were discussed:
   (a) criteria for grouping pupils;
   (b) the size of groups;
   (c) the organisation of groups;
   (d) the role of teachers, pupils and groups;
   (e) management of the classroom;
   (f) reward structures;
   (g) evaluation procedures.

5. Preparation of lessons and materials for co-operative learning. This included:
   (a) step-by-step guidelines for preparing lessons;
   (b) examples of already-prepared lessons and materials;
   (c) teachers preparing their own lessons and materials.

6.5.1.4 Instructional practices

Since the focus of the workshops was on instructing participants in the use of co-operative learning, the atmosphere in the classroom and the arrangement of the workshop meeting room were both taken into account. Activities were co-operatively structured, and in them participants worked together in groups to complete activities especially designed to enable teachers to acquire the skills necessary for co-operative learning. Books about co-operative learning and materials were available as resources, and the tables in the room were arranged for small group work, with easy access to them throughout the room. These arrangements helped to establish a warm, welcoming, non-threatening workshop setting. Participants were encouraged to discuss their feelings with their fellow group members and to discuss any questions, concerns or ideas with the instructors at any time.

6.5.1.5 Evaluation of the training programme

To evaluate the training workshops the diary technique was used. This allowed the researcher to gauge teachers' perspectives on the training programme. Teachers were asked to evaluate the programme in terms of content, organisation and effectiveness. The diary technique is explained in more detail in the methodological section below.

6.5.1.6 Participants in the workshop

In order to identify a group of male science teachers to be trained to use co-operative learning, the researcher delivered a presentation on co-operative learning to fifteen primary school science teachers. The presentation was delivered to only fifteen teachers because, at the time it was given, all teachers were engaged in preparing resit

examinations for the retained pupils, and in other school duties. Moreover, the Science Supervision Department in the Ministry of Education suggested that it should only invite those who were likely to have an interest in learning new teaching methods and a desire to enhance their pupils' progress. For evidence about the teachers' performance the Department would rely on supervisors' reports. The presentation delivered by the researcher was designed to cover the following areas:

1. The basic concept of co-operative learning.
2. Practical issues in co-operative learning, such as:
   (a) the role of teachers, pupils and groups;
   (b) classroom arrangements;
   (c) reward structure;
   (d) evaluation procedures.

Following the presentation, all the teachers present were given a special form designed to identify who would be interested in taking part in the training programme. The form asked whether they would be interested in taking part and other questions such as name, school, nationality and phone number. Eight male primary science teachers were interested in training to implement co-operative learning in classrooms. Of the eight, six were Qatari and two non-Qatari. It should be noted that the aim was to investigate whether Qatari pupils could benefit from co-operative learning. This being so, and given that this was a pilot project, it was appropriate to select volunteer teachers in this way.

6.5.2 Research questions and method of investigation

The second stage was concerned with examining the following questions:

1. Can science teachers in Qatari primary schools be trained to use co-operative learning techniques?
2. What are the difficulties teachers encountered in training to use co-operative learning?

3. What are the difficulties teachers anticipated in implementing co-operative learning in classrooms?

In the training programme teachers were asked to write up their diaries after each of the six workshops. The main objectives of using this technique were to collect data relating to teachers' perceptions of the training programme, and to answer the questions given above.

6.5.3 Methodological considerations

Diaries, as Elliott (1991) points out, can aid understanding of a case under investigation. Kemmies and McTaggart (1988) point out that diaries should contain an account of feelings, reactions, observations, reflections, interpretations, hunches, hypotheses and explanations. Hook (1985), moreover, states the following:

> Diaries contain observations, feelings, attitudes, perceptions, reflections, hypotheses, lengthy analyses, and cryptic comments. The entries are highly personal conversations with one's self, recording events significant to the writer, they are not meant to be regarded as literary works, as normally the accounts or remarks are read only by the writer and no-one else. (p. 128)

Hopkins (1993) points out that pupils' diaries can be used to obtain: (1) a pupil perspective on a teaching method; (2) data on the general climate of the classroom; and (3) information for triangulation. Diaries have been classified as being of three types. The *intimate journal* is a set of personal notes, perceptions and accounts of experiences written over a long period. The second type, the *memoir*, is less personal and often written in a relatively short time. The third type, the *log*, is a running record of events, meetings, transactions and other activities of individuals during a limited period of time (McKernan, 1991; Nachmias and Nachmias, 1987). The main advantages and disadvantages of diaries are summarised in Figure 6.2.

Advantages	Disadvantages
• They enable pupils to communicate through written as well as oral modes	• They may not be an established activity in the school
• They contain authentic expression of one's perceptions over an extended period of time	• Younger children find it difficult to record their thoughts and feelings
• They can be either focused on a specific training episode or related to the overall classroom environment	• Pupils may be inhibited in discussing their feelings with the teacher
• They can help in identifying individuals' problems	• Pupils' diaries are subjective
• They involve learners in improving the quality of the class	• Their use as a source of data may cause ethical problems
• They provide information for triangulation	

Figure 6.2 Advantages and disadvantages of diaries (adapted from Hopkins, 1993; McKernan, 1991 and Nachmias and Nachmias, 1987)

In this study, teachers were asked to keep a log outlining their observations, feelings, attitudes and reflections during the co-operative learning training programme and the implementation of co-operative learning in classrooms.

They were asked to write up their diaries after each of the six workshops as well as after each lesson they taught. Bogdan and Biklen (1992) write:

> There are other materials that are similar to diaries, but much less intimate. There are special purpose logs such as those teachers might keep. Lesson plans with accompanying notes are interesting, especially if they contain personal comments. (p. 134)

The main objectives of using the diary technique were to obtain data relating to teachers' perspectives on the training programme and on the implementation of co-operative learning in practice. Moreover, they aimed to find out what difficulties teachers encountered, how they tried to overcome them and how successful they were.

6.6 Stage 3

The main objectives of this stage were to examine how effectively the teachers used co-operative learning in the classroom, investigate pupils' perceptions of the experience of co-operative learning, and identify problems teachers and pupils encountered in co-operative learning.

6.6.1 Research questions

This stage examined the following questions:

1. Can science teachers in Qatar change their teaching methods so as to promote co-operative learning?

2. Can pupils in Qatari primary schools respond effectively to group processes?

3. Can one find positive perceptions of the experience of co-operative learning among primary school pupils in Qatar?

4 Can one expect any differences in science achievement scores between pupils who experience co-operative learning and those who do not?

5. Does co-operative learning have a differential impact on the achievement level of pupils with high and low prior knowledge?

Five data-gathering techniques were used to examine the above questions. These were diaries, interviews, observations, questionnaires and achievement tests. The following sections discuss these five techniques and the sample for this stage.

6.6.2 Selection of instrument and sample

Following the training programme, all seven teachers who participated in the workshop (one having dropped out since he had given up teaching) were asked whether they would be interested in taking part in the experimental programme. Four teachers said they were. Of these four, three were Qatari and one non-Qatari. The teachers were all

university graduates, and had from four to nineteen years' teaching experience. They teach in three different institutions. All the teachers taught both treatment and control groups except one, who taught only one group (an experimental group). They conducted two preparatory lessons and four experimental lessons.

The teachers were asked to record the impediments, problems and dilemmas they encountered during the four experimental lessons using co-operative learning. The total number of diary entries expected was 16 (4 per teacher). The response rate of the teachers in writing their diairies was very high: the maximum number of entries expected was received.

The four teachers were also interviewed on two occasions, before and after implementation of co-operative learning, using structured interviews. The interviews aimed to obtain information about the teachers' existing teaching methods, to examine their commitment to co-operative learning, and to explore the advantages, disadvantages and difficulties they encountered in implementing co-operative learning. All the interviews were (audio) tape recorded, except that one teacher preferred to have the questions in advance so as to answer them in writing.

The teachers were also observed throughout the experimental lessons. Observers were given a specially-designed structured checklist to complete at the time of the observation (see Appendix 7). Also, observers were asked to write a report immediately after observing the lesson, using the comments recorded in the observation schedule. The total number of observation checklists and reports expected was 32 (16 checklists

and 16 reports). All the 32 observation schemes and reports were received at the end of the experimental lessons.

6.6.3 Methodological considerations

This section is concerned with identifying the data-gathering techniques used in this stage and demonstrating the considerations and procedures which were followed in constructing them.

6.6.3.1 Structured interviews

Nachmias and Nachmias (1987) define the personal interview as:

> a face-to-face interpersonal role situation in which an interviewer asks respondents questions designed to obtain answers pertinent to the research hypotheses. The questions, their wording, and their sequence define the extent to which the interview is structured. (p. 26)

Like any technique, the interview has its inherent advantages and disadvantages, and these are shown in Figure 6.3. Interviews are of three main types as regards their content and organisation: structured, semi-structured and unstructured. In this study, the structured (focused) interview was used, in which the interviewer asks certain questions of all interviewees (McKernan, 1991). The characteristics of this type of interview are as follows (Merton and Kendal, 1946):

1. It involves subjects known to have been involved in a particular experience.
2. It reflects a situation which has been analysed prior to the interview.
3. It operates on the basis of a schedule specifying themes related to the study hypotheses.
4. It is concerned with the interviewees' subjective experiences regarding the theme in question.

Advantages	Disadvantages
• The interview allows greater flexibility in the questioning process • The interview allows far greater control over the interview situation • The interview allows the interviewer to probe areas of interest as they arise during the interview • Usually the personal interview results in a higher response rate than questionnaires • The interviewer can gather supplementary information about the subject • The interviewer is in direct contact with the respondent	• The cost of interview studies is significantly higher than the cost of the questionnaire • The interview is highly vulnerable to the bias of the interviewer • The interview lacks anonymity, which the questionnaire typically provides

Figure 6.3 Advantages and disadvantages of the interview technique (adapted from Hopkins, 1993, McKernan, 1991 and Nachmias and Nachmias, 1987)

This type of interview was chosen because it allows the respondent to raise issues and mention topics as the interview progresses (Hopkins, 1993). Further, it permits the interviewer to obtain details of personal reactions, specific emotions and suchlike (Nachmias and Nachmias, 1987). Also, it provides comparable data across subjects (Bogdan and Biklen, 1992).

The above-mentioned advantages and disadvantages were taken into account when constructing the interview schedules for this study. Teachers who implemented co-operative learning in classrooms were interviewed on two occasions: after the training programme and after they implemented co-operative learning in practice. Two kinds of item were used in the construction of schedules used in interviews, closed-form items and open-ended items (Slavin, 1984b). With closed-form items the respondent is asked

to select a response from two or more alternatives; with open-ended items, the respondent is allowed to construct the response. Slavin (1984b) notes that:

> a mixed strategy can be used; respondents may be given closed-form questions and then asked to elaborate if they make certain responses. (p. 90)

Wiersma (1986) supports this view, pointing out that both types are usually used in a single interview, though he maintains that:

> [w]hen items require an open-ended response or a forced response, they should be clearly stated in complete question form, with unambiguous terms that are meaningful to the respondent. Also, terms should have consistent meaning across respondents. The item should give the respondents adequate direction. Sometimes, optional wording or optional probes are given with items, but these should be used with caution. (p. 183)

Cohen and Manion (1989) report several advantages associated with using open-ended questions in an interview. Such questions, they argue:

> are flexible; they allow the interviewer to probe so that he may go into more depth if he chooses, or clear up any misunderstandings; they enable the interviewer to test the limits of the respondents' knowledge; they encourage co-operation and help establish rapport; and they allow the interviewer to make a truer assessment of what the respondent really believes. Open-ended situations can also result in unexpected or unanticipated answers which may suggest hitherto unthought of relationships or hypotheses. (p. 313)

Both open-ended and closed-form questions were used in the pre- and post-interviews. The pre-interview aimed to find out teachers' existing teaching methods in order to evaluate the workshop content and usefulness, to find out how teachers feel about implementing co-operative learning, and to explore the advantages, disadvantages and difficulties teachers expected in implementing co-operative learning in classrooms.

The interview contained 11 questions, both open-ended and closed-form. Questions 1–5 were concerned with traditional teaching methods, difficulties that the teachers faced in teaching the science curriculum, and the freedom of teachers to use the teaching method which they think is suitable for their classes. Questions 6–10 dealt with the concept of co-operative learning, the advantages and disadvantages of co-operative learning, and

the difficulties teachers might encounter in implementing co-operative learning in practice. Question 11 was concerned with the readiness of the teachers to implement co-operative learning in classrooms (see Appendix 5).

The post-interview aimed to evaluate the implementation of co-operative learning in classrooms from a teacher's perspective. The interview contained 11 questions, open-ended and closed-form. Question 1 was concerned with teachers' readiness to implement co-operative learning, question 2 dealt with teachers' self-evaluation of their implementation of co-operative learning, while questions 3 and 4 were concerned with the difficulties teachers encountered in implementing co-operative learning and how they tried to overcome them. Questions 5–7 dealt with teachers' and pupils' enthusiasm during their experience of co-operative learning and colleagues' attitudes towards co-operative learning. Questions 8–9 were concerned with the advantages and potential of co-operative learning in Qatari primary schools. Question 10 asked the teachers to re-evaluate the training programme, and question 11 asked them if they were aware of any teaching method that could produce better results than co-operative learning (see Appendix 3). Both pre- and post-interviews were given to a panel of experts to check content and validity. The experts returned the interviews with comments and suggestions. Then a final version of the interviews was developed, and interviews conducted before and after implementing co-operative learning.

6.6.3.2 Observation

Medley and Mitzel (1963) state the following:

> Certainly there is not a more obvious approach to research on teaching than direct observation of teachers while they teach and pupils while they learn. Yet it is a rare study indeed that includes any formal observation at all. (p. 24)

Anderson and Burns (1989) point out that, over the past two decades, observation has become a primary source of data gathering for researchers as they study the classroom environment. Observation can be understood by reference to structure. McKernan (1991) divided observation into two kinds, participant and non-participant. Discussing the former, Gay (1992) writes:

> In participant observation, the observer actually becomes a part of, a participant in, the situation to be observed. (p. 238)

In participant observation the researcher assumes either a complete participant role or a participant-as-observer role. A complete participant role means that the observer's identity is unknown, as are the objectives of the research. Moreover, the participant observer becomes part of the individual or group to be studied (Nachmias and Nachmias, 1987). With the participant as observer, the identity of the observer is known, as are the objectives of the research. In addition, the subjects know that the observer is there only as long as the study continues. However, the observer should commit himself to being an active member of the group and establish a close relationship with those who are to be observed.

McKernan (1991) also emphasises the importance of participant observation:

> Participant observation is axiomatic in both teaching and action research since the practitioner must be committed to the study of his or her practice ... participant observation bears the highest fidelity with the methodological purpose of action research and is the foremost technique for use in the study of classroom and curriculum. (p. 63)

He adds, however, that research which employs participant observation is characterised by the collection of large amounts of data that are difficult to code, categorise and analyse.

Of the second type of observation, non-participant observation, Gay (1992) writes:

> In non participant observation, the observer is not directly involved in the situation to be observed. In other words, the observer is on the outside looking in and does not intentionally interact with, or affect, the object of the observation. (p. 234)

Gay (1992) divides non-participant observation into five types: naturalistic observation, simulation observation, the case study, content analysis, and meta-analysis. In *naturalistic observation*, in which the study takes place in a natural setting, the aim is to describe the situation as it occurs, without controlling or manipulating anything. The problem with this type of observation is that the presence of the observer in the situation may result in unnatural reactions on the part of the observed subjects. The second type is *simulation observation*, in which the researcher manipulates the situation to be observed and tells subjects what they should be engaged in. The disadvantage of this type of observation is that the behaviour and reactions of the subjects may not be representitive of their behaviour and interaction in more 'natural' settings.

McKernan (1991) defines the *case study* as:

> a formal collection of evidence presented as an interpretative position of a unique case, [which] includes discussion of the data collected during fieldwork and written up at the culmination of a cycle of action. (p. 74)

The major disadvantages of case studies are possible observer bias and lack of generalisability (Gay, 1992). A fourth type of observation is *content analysis*, in which the composition of the object of study is analysed systematically and described quantitatively. Content analysis may focus on books and documents, and may be quite simple or very sophisticated (Gay, 1992).

The fifth type of non-participant observation is *meta-analysis*, in which a group of studies which have investigated the same problem are summarised using a statistical approach. Two major problems have been reported as being associated with this type of

observation. The first is the subjectivity involved, and the second is the difficulty of the reviewing task owing to the increasing number of studies available for review (Gay, 1992).

In general, observation, like any data-gathering technique, has its advantages and disadvantages. Anderson and Burns (1989) and McKernan (1991) have reported several advantages and disadvantages, shown in Figure 6.4.

There are two levels of non-participant observation. The first is unstructured observation, in which the observer records all the relevant data that he/she can in the time available (i.e. activities, interactions and problems). However, in order to make this technique useful, the observer must have a good idea of what to look for during the observation session (Turney and Robb, 1971). The second is structured observation, in which the observer has a pre-determined behavioural category to look for during the observation period, as indicated by checklists, rating scales or interaction analysis protocols (McKernan, 1991). A single observation instrument, however, whether a checklist or rating scales, cannot capture detailed information on a large number of variables. Moreover, it cannot record what emerges in the setting, such as problems and unexpected events. Therefore, both unstructured observation (i.e. the writing of comments and reports) and structured observation (checklists) techniques were used in this study to obtain the data needed.

Advantages	Disadvantages
• It allows the researcher to study the situation in the natural environment	• Observation can be expensive in terms of both time and money
• It provides greater detail and more precise evidence than any other source	• Data gathered using observation is susceptible to a variety of errors
• It can be useful in stimulating change and verifying that the desired change has taken place or not, at a particular time	• It is often difficult to frame a coding from massive amounts of qualitative data
• It allows the observer to record non-verbal behaviour	• The results of the observation permit discussion only in relation to the case studied
• The observer can take as much time as is required to gain a representative sample of behaviour	• With an observer present in the situation, a reactive effect may be introduced into the setting, which may result in unnatural reactions

Figure 6.4 Advantages and disadvantages of observation (adapted from Anderson and Burns, 1989 and McKernan, 1991)

Turney and Robb (1971) corroborate this approach:

> It is possible, also, to use a combination of these two methods; that is, a check list might be used to record categorised behaviour, but the observer might also write as many additional comments as time permits. (p. 143)

They point out that such a combination of methods greatly enhances understanding of the variables under study. In this study the observation instrument was used to gather information relating to pupils' behaviour, functioning and interactions. The pupils' schedule paid close attention to such variables as pupils' functioning in groups (i.e. pupils' roles and contributions), pupils' behaviour in groups (i.e. pupils' off-task behaviour), pupils' interdependence (i.e. sharing materials and resources) and pupils' interaction (i.e. in the group itself and with other groups).

The variables relating to social skills were obtained from research published by Johnson and Johnson (1975, 1991). For example, Johnson and Johnson categorise social skills as either task skills or maintenance skills. Both types must be observed in order to evaluate

the effectiveness of group process. They offer a number of examples of these skills, including:

Task skills

- sharing information and ideas
- checking for understanding
- keeping track of time
- following directions

Maintenance skills

- checking for agreement
- encouraging others
- addressing group members by name
- sharing feelings
- responding to ideas

Variables relating to major off-task behaviour pupils experience in small-group learning, on the other hand, include such behaviours as failure to keep up and the display of physical and verbal aggression (see Chapter 5, p. 110).

Johnson *et al.* (1991) suggest five guidelines to be considered when structuring an observation schedule for observing pupils in co-operative learning situations:

1. Decide which co-operative skills you wish to observe.
2. Construct or find an observation sheet that specifies the co-operative skills you wish to observe.
3. Observe the group and, on the observation sheet, record how often each student performs the specified behaviours.

4. Summarise your observations in a clear and useful way and present them to the group as feedback.

5. Help group members make inferences from your observations about how well the group functioned (s. 6:13).

The pupils' observation schedule for the present study was constructed in the light of the above delineation of social skills and categories as well as the above guidelines. The observation schedule consisted of two major categories (social skills and behaviour), each containing detailed questions (see Appendix 8). Having described the design of the pupils' observation schedule, we now offer a similar description of the teachers' observation schedule.

Since teachers' roles in the co-operative learning situation differ from those of pupils, the variables for the teachers' observation schedule focused on different areas. Johnson *et al.* (1991) identify the teacher's major roles and describe how these roles are to be performed. These roles are as follows:

Formulating objectives and making decisions

- specifying instructional objectives
- deciding on the size of the group
- assigning pupils to learning groups

Structuring the task and interdependence

- explaining the academic task
- structuring positive goal interdependence
- structuring individual accountability
- structuring inter-group co-operation

- explaining criteria for success
- specifying desired behaviours

Monitoring, intervening and evaluating

- monitoring pupils' behaviour
- providing task assistance
- intervening to teach collaborative skills
- providing closure to the lesson
- evaluating the quality and quantity of pupils' learning
- assessing how well the group functioned

In the light of these considerations the teachers' observation schedule paid careful attention to the following variables: making decisions (i.e. the size of the group and assigning pupils to groups); formulating objectives (i.e. academic and social objectives); structuring the task and interdependence (i.e. explaining the academic task and structuring positive interdependence); and monitoring pupils (i.e. monitoring pupils' behaviour and providing task assistance); and evaluation (i.e. evaluating groups and individuals). The teachers' observation schedule consists of five main categories, each containing several questions (see Appendix 7).

Observations were carried out by the researcher and by two trained observers. Teachers and pupils were observed on four occasions (each of 45 minutes) throughout the implementation phase, which lasted for six days because the researcher was granted only a limited time-period to carry out the implementation. Using a rotation system, observers monitored all teachers and classrooms equally, thus limiting observer bias.

Observers were asked to write a report immediately after observing the lesson, using the comments recorded in the observation scheme. The report served to explain and describe the atmosphere in the classroom and to provide more detailed information relating to some of the items in the observation scheme. The researcher met with the observers every afternoon, for two reasons: to collect the observation schedules and reports, and to discuss any problems or difficulties observers might have had in their observation activity.

It was felt approprate that the observers received adequate training for their task. Wiersma (1986) states:

> Collecting data through observation is a relatively demanding task. It requires considerable training of observers, who must be consistent in recording what they observe. Thus, agreement of observation is always a concern, not only between different observers, but also between the different observations of a single observer. (pp. 305–6)

Gay (1992) supports this view. He points out that observers should be trained in order to gain an assurance that all observers are observing the same behaviours in the same way. He adds that observers should participate in practice sessions at which they observe activities similar to those which will be involved in the study.

With the help of the Educational Research Centre, the Psychology Department and the Physical Education Department of Qatar University three observers were identified to help the researcher in observing pupils and teachers during the experiment period. The following were the names and positions of the observers:

Name	*Position*
Ahmed Al-Emadi	Assistant teacher
Khalid Mohammed	Demonstrator
Saleh Ibrahime	Researcher

The observers were assembled and informed of the scope and purpose of the study. Observation schedules were reviewed and discussed with observers item by item. Questions and concerns raised by observers were answered and discussed. The observers ran trials on the observation schedule on four occasions, three with the microteaching lessons in the training programme and one in a real classroom. After each observation session the researcher and the observers discussed the points of disagreement to reach a consistent understanding of the observation schedule.

Table 6.1 demonstrates the agreement between observers for the teachers' observation schedule on four occasions. It shows that the reliability increased with time and practice.

Table 6.1 Agreement between observers: teachers' observation schedule

Trial Number	Agreement	Disagreement	Overall reliability
1	20	9	.68
2	22	6	.78
3	25	4	.86
4	25	4	.86

Table 6.2 presents the reliability between observers for the pupils' observation schedule on four occasions. It shows that reliability increased with time and practice.

Table 6.2 Agreement between observers: pupils' observation schedule

Trial Number	Agreement	Disagreement	Overall reliability
1	20	13	.60
2	26	7	.78
3	28	5	.84
4	29	4	.87

The overall reliability was calculated using the following formula offered by Slavin (1984):

$$\text{Overall reliability} = \frac{\text{number of times observers agreed}}{\text{number of agreements + number of disagreements}}$$

Slavin (1984) suggests that an average overall reliability of .80 would usually be considered reasonable. If lower reliabilities obtain, retraining should be carried out.

6.6.3.3 Pupils' questionnaire

The sample for the pupils questionnaire was 123 primary school pupils, representing all the pupils in four classrooms in three different schools in the state of Qatar. These pupils were selected because they were taught science by teachers who identified themselves as interested in implementing co-operative learning in classrooms.

There were four main reasons behind the decision to use the questionnaire technique to obtain information from pupils: (1) pupils are too large a group to be interviewed in the hope of obtaining representative data; (2) for cultural reasons pupils would prefer to respond to questionnaires rather than interviews; (3) it is easier to obtain data from questionnaires than from interviews; (4) since pupils have to answer the questionnaire in the classroom in the presence of the researcher, it is hoped that the replies will be more accurate than those gained by any other methods.

The pupils' questionnaire in this study was designed in the light of the Classroom Life Measure (CLM) tool developed by Johnson and Johnson (1983) and the MPSL (My Preferred Style of Learning) tool developed by Al-Dirainy (1987). The rationale behind these two research tools is that they are specifically designed for understanding classroom life and learning conditions. Also, the data obtained by using these tools can easily be analysed, because the tools are based on a straightforward Likert-type scale. Further, neither tool allows the respondent to remain undecided. Finally, the CLM,

especially, is widely used by other researchers such as Beck (1992) and Kosters (1990) who have found it effective for collecting data in the classroom situation. The CLM instrument consists of 90 Likert-type questions on a five-point scale, where respondents indicate the degree of truth or falsity of the items. It contains 17 factors derived from earlier research and from other evaluation instruments developed by Johnson and Johnson. The alpha coefficients for these factors range from .51 to .83. The MPSL, by contrast, consists of 26 Likert-type questions on a five-point scale which respondents answer in terms of degree of agreement or disagreement. It contained two factors, co-operation and competition.

For the purpose of this study the researcher developed a new questionnaire drawing on the CLM and MPSL rather than an actual version of them. There were several reasons for this decision:

1. The original CLM questionnaire was too long for the pupils in the present study in view of their age, as it consists of 90 Likert-type questions covering a wide range of areas. McKernan (1991) suggests that the questionnaire should not be too long.

2. The original CLM covers areas that are not of concern to this study, such as learning with heterogeneous peers.

3. Both the CLM and the MPSL consist of a five-point scale constructed in terms of the degree of truth or falsity of the statement. This type of answering scale is not recommended for primary stages. Hopkins (1993) recommends that when questionnaires for primary stages are constructed the usual five-point scale should be condensed to two or three responses.

4. Both the CLM and the MPSL were developed and piloted in learning environments different from that in which this study took place.

5. Both questionnaires address the issue of learning style in general, whereas this study was concerned with learning science in particular.

6. Neither questionnaire focuses on traditional teaching methods, which are an area of concern in the present study.

In view of the fact that primary school pupils have not yet attained subtlety in their use of the English language, the pupils' questionnaire was constructed in Arabic, the medium of instruction and communication in Qatar. This questionnaire instrument used a four-point scale based on the degree of truth of the statement.

6.6.3.4 The achievement test

Gay (1992) defines achievement tests as follows:

> Achievement tests measure the current status of individuals with respect to proficiency in given areas of knowledge or skill. (p. 170)

According to Gronlund (1976), moreover:

> classroom tests play a central role in the evaluation of pupil learning ... They provide relevant measures of many important learning outcomes and indirect evidence concerning others ... The validity of information they provide, however, depends on the care with which the tests are planned and prepared. (p. 135)

In order to determine the effectiveness of the implemention of co-operative learning on pupils' achievement, pre- and post-achievement tests were given, both to pupils who had not experienced co-operative learning, as a control group, and to pupils who had experienced co-operative learning, as a treatment group. Both groups were taught the same content using the same materials in the same period and the same number of lessons.

Construction. The researcher and teachers who implemented co-operative learning in classrooms designed an achievement test that covered all the lessons taught in the experiment period (see Appendix 13). The following considerations were taken into account when the achievement test was designed:

1. Determining the purpose of testing.
2. Building a table of specifications.

3. Selecting appropriate item types.

4. Preparing a set of relevant test items. (Gronlund, 1976, p. 135)

Purpose. In this study the achievement test was used as a baseline test at the beginning of the experiment period to measure the extent to which pupils had already achieved the objectives of the planned instruction (Gronlund, 1976). In addition, it was used as a summative test to measure the pupils' mastery of the instructional objectives at the end of the experiment period (Hanna, 1993).

List of instructional objectives. Thorndike and Elizabeth (1961) argue that, in constructing any test, it is important to identify the desired objectives, stating what the pupil was expected to achieve. Therefore, objectives for the achievement test were identified in advance. By the end of the experimental lessons pupils should be able to:

1. List the ways in which plants multiply.
2. Explain, with illustration, how date (palm) trees multiply from cuttings.
3. List the methods of seed dispersal.
4. Explain the role of the wind in seed transport.
5. Explain the role of running water in seed transport.
6. Explain the role of animals in seed transport.
7. Identify the seed components.
8. Germinate the seed of broad beans with illustrations.
9. Draw a broad bean seed with relevant clarification.
10. List the places in which water plants live.
11. List the types of water plants.
12. List the attributes of water plants in terms of:
    (a) whether they are covered by water;
    (b) leaf shape;
    (c) stem adaptation.

Content. The following are the main topics and sub-topics taught to both the control and the experimental groups:

Lesson 1

Topic: Propagation of plants
Sub-topics: Methods of plant propagation
Methods of vegetative propagation

Lesson 2

Topic: Seed dispersal
Sub-topics: Methods of seed dispersal
The role of wind, animals and running water in seed dispersal

Lesson 3

Topic: Seed components
Sub-topics: The components of broad bean seeds with illustration
Methods of germinating seeds of broad beans and lentils

Lesson 4

Topic: Water plants
Sub-topic: Places in which water plants live
Types of water plants
Attributes of water plants

For a full description of the lessons' development see Appendix 14.

Test item types. Gronlund (1976) states the following:

> The items used in classroom tests are typically divided into two general categories: (1) the objective item, which is highly structured and requires the pupil to apply a word or two to select the correct answer from among a limited number of alternatives, and (2) the essay questions which permit the pupil to select, organise, and present the answer in essay form. There is no conflict between these two item types. For some instructional purposes the objective item may be most efficient while for others the essay question may prove most satisfactory. (p. 144)

The achievement test for this study, then, included both objective items and essay items. Moreover, it included skills items which required pupils to illustrate answers by drawing. The following are the types of test item used in the achievement test:

1. *Short answer questions*

   This type of item presents situations involving recall and comprehension of knowledge acquired in learning the instructional lessons. There were four questions of this type.

2. *True/false items*

   This type of item is designed to test understanding of principles. Pupils were asked to answer the questions under this item by ticking either true or false for each question. There was one item of this type containing five statements.

3. *Explanation with illustration*

   In this type of question pupils are asked to answer the question in detail with illustration (a drawing). There were three questions of this type.

Scoring. Scoring keys were prepared for each test item. Weights were determined in terms of the task difficulty in each item. For example, one mark was allotted for each of the true or false statements. More weight was allotted to questions which required more effort, writing and skill. The total test score was 25 for all the nine test items.

Scoring essay questions has always been difficult and subject to potential bias. To overcome this problem a clear criterion was established to help teachers grade pupils' answer sheets. In addition, each answer sheet was graded twice, by two different teachers, and the sum of the two scores was taken as the final score. Furthermore, in order to prevent any bias towards the treatment or the control group all answer sheets for both groups were numbered and mixed together without the pupils' names.

6.6.4 Validity and reliability of the study instruments

It is vital for any successful research to employ valid instruments. Borg (1987) defines validity as the:

> degree to which a test or other measurement tool measures what it claims to measure. (p. 92)

Slavin (1984b) and Gay (1992) identify four types of validity: (a) content validity, (b) concurrent validity, (c) construct validity, and (d) predictive validity. Slavin defines *content validity* as the:

> degree to which the content of a test matches some objective criterion, such as the content of a course or textbook, the skills required to do a certain job, or knowledge deemed to be important for some purpose. (p. 81)

He defines *concurrent validity* as the:

> correlation between scores on a scale and scores on another scale or measure of established validity given at about the same time. (p. 82)

Gay (1992) defines *construct validity* as the:

> degree to which a test measures an intended hypothetical construct (p. 157),

and *predictive validity* as the:

> degree to which a test can predict how well an individual will do in a future situation. (p. 159)

Establishing the content validity was our main concern here. Nachmias and Nachmias (1987) argue that there is no one best way by which validity can be established or evaluated. However, Gay (1992) suggests that content validity can be determined by expert judgement. 'Usually', he writes:

> experts in the area covered by the test are asked to assess its content validity. These experts carefully review the process used in developing the test as well as the test itself and make a judgement concerning how well items represent the intended content area. (p. 157)

Therefore, questionnaires, interviews and observation schedules were given to six experts in Qatar University to advise on their content validity, bearing in mind the research aims and questions.

After making a number of changes and modifications to both the content and the format of the instruments (for example, questions 23, 24, 25 in the teachers' questionnaire were changed from open-ended questions to Likert-type questions), the judges agreed that the instruments used in this study had significant content validity.

The following are the names and academic positions of the advisers:

Name	*Position*
Professor Mahmoud Abdul-Haleem	Teacher of Physical Education
Dr Mahmoud Al Ghandour	Teacher of Statistics and Research Methods
Dr Sameer Abdul Baset	Teacher of Social Education
Professor Anwar Reyiad	Head of the Cognitive Psychology Department
Dr Fouzi Zaher	Director of the Educational Technology Centre
Dr Salah Al Zanaty	Teacher of Science Education

Obtaining content validity for an achievement test is very important, as Gay (1992) points out:

> A test score cannot accurately reflect a student's achievement if it does not measure what the student was supposed to learn. (p. 156)

Consequently, the achievement test was developed initially by the four teachers who participated in implementing co-operative learning in schools. The test was then given to three specialists so that they could judge its structure and content. The judges were given the objectives and content of the lessons, and the test questions, so they could judge the questions' validity. The following are the names of the achievement test examiners:

Name	*Position*	*Years of experience*
Dr Salah Al Zannaty	Teacher of Science Education	30 years
Abdullah Mahmoud	Science Teacher	8 years
Adel Hassan	Science Teacher	8 years

All the examiners agreed that the achievement test had content validity and an appropriate structure.

Next to validity, probability is, according to Gronlund (1976):

> the most important characteristic of evaluation results ... Reliability (1) provides the consistency which makes validity possible, and (2) indicates how much confidence we can place on our results ... The practicality of the evaluation procedure is, of course, also of concern to the busy classroom teacher. (p. 105)

Nachmias and Nachmias (1987) define reliability as the:

> extent to which a measuring instrument contains variable errors, that is, errors that differed from observation to observation during any one measuring instance, or that varied from time to time for a given unit of analysis measured twice or more by the same instrument. (p. 172)

Consistency of measurement is the most important aspect of reliability. There are different types of consistency and they should be determined by different methods (Table 6.3). Gronlund (1976) notes that:

> different types of consistency are determined by different methods – consistency over a period of time, consistency over different forms of the instrument, and consistency within the instrument itself. The reliability coefficient resulting from each method must be interpreted in terms of the type of the consistency being investigated. (p. 108)

Gay (1992) suggests that questionnaires should be piloted before they are conducted. He points out that pre-testing questionnaires not only serves to identify the problems in understanding the directions and questions in them, but also:

> yields data concerning instrument deficiencies as well as suggestions for improvement. Having two or three available people complete the questionnaire first will result in the identification of major problems. The subsequently revised instrument and the covering letter should then be sent to a small sample from your intended population or a highly

similar population. Pre-test subjects should be encouraged to make comments and suggestions concerning directions, recording procedures, and specific items. (p. 229)

Table 6.3 Methods of estimating reliability of questionnaire items (adapted from Gronlund, 1976)

	Type of Reliability Measure	Procedure
• Test–retest method	• Measure of stability	• Give the same test twice to the same group with any time interval between tests from several minutes to several years
• Equivalent forms method	• Measure of equivalence	• Give two forms of the test to the same group in close succession
• (Test–retest with equivalent forms)	• Measure of stability and equivalence	• Give two forms of the test to the same group with increased time interval between forms
• Split-half method	• Measure of internal consistency	• Give test once. Score two equivalent halves of test (e.g. odd items and even items); correct reliability coefficient to fit whole test by Spearman–Brown formula
• Kuder–Richardson method	• Measure of internal consistency	• Give test once. Score total test and apply Kuder–Richardson formula

For these reasons, both the teachers' and the pupils' questionnaires were piloted before implemention. Ten copies of the teachers' questionnaire were given to five male and five female teachers from the intended population. Teachers were told the purpose of the study and encouraged to write comments and suggestions concerning directions and questions in the questionnaire. All ten questionnaires were returned with a number of suggestions and comments. The questionnaire was revised in the light of the pre-test subjects' comments. The final version of the questionnaire was discussed with the judges in person. One week later, the questionnaire was given to the same ten teachers to obtain its test–retest reliability (coefficient of stability). The correlation coefficient of

the teachers' questionnaire test–retest was .94. This suggests that the correlation between the two applications of the questionnaire was reasonably high. As a result, the final questionnaire, covering 200 subjects, was printed.

The pupils' questionnaire was administered to ten pre-test subjects in the presence of the researcher. Pupils were encouraged to raise their hands or ask questions if any instruction or statement was ambiguous. Few questions were found difficult for the pupils to understand. The researcher made notes about the questionnaire as it was being administered. The final version was developed in the light of the pupils' comments. One week later, the questionnaire was given to the same ten subjects to obtain its test–retest reliability (coefficient of stability). The correlation coefficient of the pupils' questionnaire test–retest was .91. This suggests that the pupils' questionnaire was reliable.

The achievement test was also given to ten subjects on two occasions, with a one-week interval between them, to obtain its test–retest reliability. The correlation coefficient was .97. This indicates that the achievement test was highly stable.

6.6.5 Fieldwork

Bogdan and Biklen (1992) describe fieldwork as:

> the way most qualitative researchers collect data. They go to the subjects and spend time with them in their territory – in their schools, their playgrounds, their hangouts, and their homes. These are the places where subjects do what they normally do, and these the natural settings that the researcher wants to study. (p. 79)

The fieldwork for this study consisted of four main stages, as follows:

1. Gaining access.
2. Validating the research instruments.
3. Preparing for the training programme.
4. Implementing co-operative learning in classrooms.

6.6.5.1 Gaining access

The first problem the researchers faced in undertaking the fieldwork for this study was obtaining permission to conduct the study. Bogdan and Biklen (1992) suggest that researchers should make their interests clear and seek the co-operation of their subjects and those responsible for giving permission. The researcher therefore wrote a letter requesting permission to train a group of teachers to use co-operative learning in classrooms, administer a questionnaire to all primary school science teachers, and implement co-operative learning in primary schools. A brief description of the study was enclosed with the letter, highlighting its purpose and methodology. After two days, permission for the study was obtained from the Under-Secretary for Educational Affairs. This permission was followed by a permission from the Primary Education Directorate, and permission was also obtained from the Science Supervision Department. Permission was needed from all these bodies in order for this study to be undertaken. The major advantages of obtaining this permission were:

1. Teachers were released from their duties to attend the training programme.
2. The teachers questionnaire was distributed to all primary schools in Qatar via official channels.
3. Schools were assigned for the implementation of co-operative learning in classrooms.

Bogdan and Biklen (1992) argue that, even if permission:

> is granted from up high without first checking with those below, it behoves you to meet those lower on the hierarchy to seek their support ... Getting permission to conduct the study involves more than getting an official blessing. It involves laying the groundwork for good rapport with those with whom you will be spending time, so they will accept you and what you are doing. Helping them to feel that they had a hand in allowing you in will help your research. (pp. 81–2)

The researcher therefore visited the teachers who decided to take part in the training programme in their schools and classrooms. He also visited the schools where implementation was to take place and met with the school principals. The school principals were co-operative. They did, however, raise a number of questions, such as:

1. What are you actually going to do?
2. Will your work be disruptive?
3. What are you going to do with your findings?
4. What will we gain from this?

The researcher responded to these questions and concerns by (1) stating the objectives of the study and methods of recording data; (2) reassuring the principals that the research would not disrupt pupils or teachers; and (3) informing the principals that the findings would be analysed and discussed as a major part of a Ph.D. dissertation. Finally, the principals were promised a brief report on the findings of this study upon its completion.

The study was conducted in three major phases. These were: (1) validation of the research instruments; (2) training of teachers to use co-operative learning in classrooms; (3) implementation of co-operative learning in classrooms. The particular steps which were taken, with their dates, are shown in Table 6.4.

Table 6.4 Timetable for piloting the instruments, conducting the training programme and implementing the experimental lessons

Number	Activity	Date
Validating and administrating instruments		
1	The research instruments, teachers and pupils' questionnaires, interviews and observation checklists were translated into Arabic and handed to three English language specialists to validate the translation.	9/9/94
2	The research instruments were given to six advisers for advice on face and content validity.	20/9/94
3	Five judges returned the instruments with comments; the returns were revised in the light of their comments.	5/10/94
4	The new versions of the instruments were printed in the following numbers: teachers' questionnaire 10 pupils' questionnaire 10 pupil observation checklists 25 teacher observation checklists 25	10/10/94
5	Ten copies of the teachers' and pupils' questionnaires were used with pilot sample. Ten teachers' questionnaires and ten pupils' questionnaires were returned with comments and with any ambiguous words and items underlined.	12/10/94–5/10/94
6	New versions of the questionnaires were prepared and discussed with the judges in person. The questionnaires were printed in the following quantities: 200 for the teachers and 250 for the pupils.	1/11/94–12/11/94
7	164 copies of the teachers' questionnaire were sent via the Science Supervision Department to all primary school science teachers.	20/11/94
8	92% of the questionnaires were returned, a satisfactory percentage.	5/12/94
9	Results of the questionnaires were fed into IBM computer worksheets for use with the SPSS programme.	25/1/95
10	The computer sheets were revised.	26/1/95
Preparing for the training programme		
1	The researcher delivered a presentation on co-operative learning strategies to fifteen male primary school science teachers.	5/9/94
2	Eight teachers declared themselves interested in training to use co-operative learning in practice.	5/9/94
3	Permission for the eight teachers to be released from duties was obtained from the Primary Education Directorate.	6/9/94
4	Further permission was obtained from the University of Qatar to use one of the lecture rooms with all its facilities for the period of the training programme.	7/9/94

Table 6.4 (cont.)

Number	Activity	Date
5	Participants in the training programme were sent welcoming letters specifying the date, time and place of the workshops.	7/9/94
6	The first day of the training programme started with the attendance of all participants.	11/9/94
7	The training programme lasted for six days.	16/9/94
8	At the end of the training programme four teachers were appointed to implement co-operative learning.	16/9/94
9	Teachers handed in their diaries, which they had written throughout the training programme.	16/9/94–18/9/94
Implementing co-operative learning in classrooms		
1	Three observers were identified to help in observing pupils and teachers in classrooms.	7/9/94
2	The observers were gathered together and taught how to use the observation checklist.	8/9/94
3	The observers used the checklist on four occasions. Three of them were in the microteaching lessons and one was in an actual classroom.	15/9/94
4	The four teachers were interviewed before implementing co-operative learning in classrooms.	24/9/94–26/9/94
5	Prior to implementing co-operative learning teachers met to develop the instructional lesson for the experiment period.	20/10/94
6	The pupils' questionnaire was administered to the treatment group as a pre-test.	19/11/94-21/11/94
7	An achievement test was administered to both treatment and control groups as a pre-test.	19/11/94–1/11/94
8	Teachers were given the lesson plans, direction sheets and materials to be used for the instructional lessons.	22/11/94
9	Teachers, with the help of the researcher, conducted a preparation lesson to familiarise pupils with co-operative learning, develop groups and assign roles.	23/11/94
10	The implementation lasted ten days.	24/11/94-3/12/94
11	The pupils' questionnaire was administered to the treatment group.	7/12/94–10/12/94
12	The achievement test was administered to both control and treatment groups.	7/12/94–10/12/94
13	The teachers handed in pupils' worksheets and teachers' diaries at the end of the implementation period.	3/12/94–5/12/94

Table 6.4 (cont.)

Number	Activity	Date
14	The four teachers were interviewed after they had implemented co-operative learning in classrooms.	12/12/94–7/12/94
15	The teachers and observers were invited to a social meeting and dinner to thank them for their efforts and co-operation during the implementation phase.	24/12/94
16	The highest group in terms of scores and co-operation throughout the lessons were given a small reward for their achievement and co-operation.	7/12/94–9/12/94
17	A thank-you letter was sent to everybody who helped in conducting the fieldwork for this study.	28/1/95

Chapter 7

Presentation and Analysis of the Teachers' Questionnaire

7.1 Introduction

Among the main aims of this study, as Chapter 1 states, is an investigation of teachers' perceptions of existing teaching methods, and of co-operative learning. Chapters 2, 3, 4 and 5 provided the cultural context of the study, the background to science education in Qatar, a review of international and regional studies, and a discussion of the cultural problems associated with co-operative learning. Chapter 6 described the scope of the research and the methodology. This chapter presents the findings from the teachers' questionnaire, the objective of which was to investigate teachers' perceptions of existing teaching methods and of the advantages and disadvantages of co-operative learning. This chapter also describes the procedures for administering the questionnaire, the response rate, the demographic data and the method of analysis.

7.2 Procedures

The questionnaire investigated the following questions and sub-questions:

1. How do teachers perceive existing teaching methods? In particular:
   (a) What are the advantages of existing teaching methods?
   (b) What are the limitations of existing teaching methods?

2. Does co-operative learning exist in Qatari primary schools? In particular:
   (a) Are some groups of teachers more likely than others to use co-operative learning?

3. How do teachers perceive co-operative learning? In particular:
   (a) What are the advantages of co-operative learning?
   (b) What are the disadvantages of co-operative learning?

4. What are the difficulties in implementing co-operative learning? In particular:
   (a) What are the cultural difficulties?
   (b) What are the resource-related difficulties?
   (c) What are the behavioural difficulties?

A sample of 164 male and female primary school science teachers was selected, representing the whole population of science teachers in the public primary schools in the state of Qatar. Teachers were given a questionnaire with a covering letter which defined its purpose. This covering letter emphasised that the responses would be treated anonymously. The questionnaire included 26 items, printed on 8 pages with laser quality printing, grouped into three main sections (see Appendix 2). Four weeks after the questionnaire was sent out, 139 copies had been received back. As a result, the researcher contacted the teachers who had not returned the questionnaire by phone to remind them to do so. Two weeks later, another 12 copies were received. Eventually, then, 151 teachers (65 male and 86 female), representing 92 per cent of the total population, responded to the questionnaire. The following section presents the method whereby the data received were analysed.

7.3 Method of analysis

After data entry, SPSS was used to produce descriptive and inferential statistics (Norusis, 1992). In order to show how primary school science teachers perceived existing science teaching methods and co-operative learning, tables demonstrating the means and standard deviations are presented.

Principal components analysis was used to investigate the factorial structure underlying the teachers' perceptions of existing teaching methods and co-operative learning. The factors were used as sub-scales when comparing the responses of certain groups of

teachers on selected variables, for example, age, sex and nationality. A one-way analysis of variance was used to test for differences between the mean ratings of teachers from three or more samples, for example teachers in three degree groups. Tukey's pairwise comparison was used when a significant result was obtained, to indicate where the differences lay. The t-test was employed to compare two samples, for example, men and women, Qatari and non-Qatari. The t-test and one-way analysis of variance were used to show the differences between the mean rating of teachers on selected variables.

7.4 Biographical data

The first section of the questionnaire was designed to collect information about the participants' gender, age, qualifications, nationality, experience, and method of teaching in the classroom and laboratory.

Table 7.1 provides a comparison between male and female teachers on the variables of nationality, age, experience and qualifications. It shows that 70.9 per cent of the science teachers were Qatari. Of these Qatari science teachers, only 24.3 per cent were male, with 75.7 per cent female teachers. This reflects the shortage of male primary school science teachers in Qatar. Only 5.8 per cent of all female science teachers are non-Qatari, compared with 60 per cent of all male science teachers. The table also shows that there is a significantly higher number of male teachers who have more than ten years' experience than of female teachers. There appears to be a relationship between age and length of experience; there are fewer female teachers (1.3 per cent) than male teachers (15.9 per cent) who are aged above 40. It is also evident that most of the teachers in Qatar stop studying after the four-year teacher training programme (B.Sc.), since only 7.2 per cent of

the teachers had a qualification higher than the B.Sc. (i.e. a higher diploma in education or a Masters degree).

Table 7.2 shows the teaching methods mainly used in Qatari primary classrooms. The noteworthy point here is that although the science curriculum for the primary stage is designed to be taught by discovery learning, 61.6 per cent of teachers say that they use lecturing as their principal method of teaching. It is also interesting to see that small-group learning is the next most widely used method of teaching; this is especially true for the female science teachers. Twenty-three out of the 86 female teachers used small-group learning methods (26.7 per cent), while only 6 out of 65 male teachers used small-group learning (9.2 per cent). It is also evident that most science teachers in Qatari primary schools demonstrate the laboratory experiments and activities themselves. This might be because they use the lecturing method very often or because of the lack of adequate resources available for teachers. However, the table should be viewed with caution. Although no difficulty was evident at the pilot stage, subsequent discussion suggests that respondents might have had difficulty in distinguishing between discovery learning, problem-solving and small-group learning. Moreover, discovery learning and problem-solving often require small groups. This indicates a problem with the validity of the data.

This can, however, be overcome by combining discovery learning, problem-solving and small-group learning into one category ('other methods'). Table 7.3 shows statistical analysis of the combined data (i.e. lecturing and other methods) for each biographical variable (gender, nationality, age, experience, qualifications).

Table 7.1 Teachers' nationality, age, experience and qualifications by gender

		Nationality		Age			Experience in years			Qualification		
Sex		Qatari N = 107	Non-Qatari N = 44	20–29 N = 65	30–40 N = 55	40+ N = 31	1–5 N = 59	6–10 N = 37	10+ N = 55	Lower than B.Sc. N = 29	B.Sc. N = 111	Higher than B.Sc. N = 11
	Number	26	39	12	24	29	17	6	42	22	37	6
Male	Per cent	24.2	88.6	18.4	43.6	93.5	28.8	16.2	76.3	75.8	33.3	54.5
N = 65	Total	65			65			65			65	
		43.0%			43.0%			43.0%			43.0%	
	Number	81	5	53	31	2	42	31	13	7	74	5
Female	Per cent	75.7	11.3	81.5	56.3	6.4	71.1	83.7	23.6	24.1	66.6	45.4
N = 86	Total	86			86			86			86	
		57.0%			57.0%			57.0%			57.0%	
Chi-Square X^2		P<.001			P<.001			P<.001			P<.001	

Table 7.2 Principal teaching methods of science teachers in Qatari primary schools by sex, nationality, age, experience and qualification

		Gender		Nationality		Age			Experience			Qualification		
Teaching method		Male N = 65	Female N = 86	Qatari N = 107	Non-Qatari N = 44	20–29 N = 65	30–40 N = 55	More than 40 N = 31	1–5 N = 59	6–10 N = 37	More than 10 N = 55	Lower than B.Sc. N = 29	B.Sc. N = 111	Higher than B.Sc. N = 11
Lecturing	Number	46	47	66	27	36	36	21	38	25	30	18	69	6
	Per cent	70.7	54.6	61.6	61.3	55.3	65.4	67.7	64.4	67.5	54.5	62.0	62.1	54.5
	Total	93 61.6%		93 61.6%			93 61.6%			93 61.6%			93 61.6%	
Discovery learning	Number	8	12	12	8	8	6	6	6	2	12	6	12	2
	Per cent	12.3	18.4	11.2	18.1	12.3	10.9	19.3	10.1	5.4	21.8	20.6	10.8	18.1
	Total	20 13.2%		20 13.2%			20 13.2%			20 13.2%			20 13.2%	
Problem-solving	Number	5	4	5	4	5	2	2	3	1	5	1	8	-
	Per cent	7.6	4.6	4.6	9.0	7.6	3.6	6.4	5.0	2.7	9.0	3.4	7.2	00.0
	Total	9 6.0%		9 6.0%			9 6.0%			9 6.0%			9 6.0%	
Small-group learning	Number	6	23	24	5	16	11	2	12	9	8	4	22	3
	Per cent	9.2	26.7	22.4	11.3	24.6	20.0	6.4	20.3	24.3	14.5	13.7	19.8	27.2
	Total	29 19.2%		29 19.2%			29 19.2%			29 19.2%			29 19.2%	

Table 7.3 Statistical analysis of the combined data (i.e. lecturing and other methods)

		Gender		Nationality		Age			Experience			Qualification		
Teaching Method		Male N = 65	Female N = 86	Qatari N = 107	Non-Qatari N = 44	20–29 N = 65	30–40 N = 55	More than 40 N = 31	1–5 N = 59	6–10 N = 37	More than 10 N = 55	Lower than B.Sc. N = 29	B.Sc. N = 111	Higher than B.Sc. N = 11
Lecturing	Number	46	47	66	27	36	36	21	38	25	30	18	69	6
	Per cent	70.7	54.6	61.6	61.3	55.3	65.4	67.7	64.4	67.5	54.5	62.0	62.1	54.5
	Total	93		93			93			93			93	
		61.6%		61.6%			61.6%			61.6%			61.6%	
Others	Number	19	39	41	17	29	19	10	21	12	25	11	42	5
	Per cent	29.2	45.3	38.3	38.6	44.6	34.5	32.2	35.5	32.4	45.4	37.9	37.8	45.4
	Total	58		58			58			58			58	
		38.4%		38.4%			38.4%			38.4%			38.4%	
Chi-square		p<.04		.97			.38			.38			.88	
χ^2		α		NS			NS			NS			NS	

Interestingly, only one significant difference appears in the table. Female teachers are significantly more likely to use teaching methods other than lecturing.

7.5 Perceptions of existing teaching methods and of co-operative learning

Tables 7.4 and 7.5 show the benefits and limitations of the existing teaching methods as perceived by teachers in Qatari primary schools. From Table 7.4 it seems evident that teachers have confidence in their teaching methods. The findings appear to suggest that their teaching methods relate science to real life, use pupils' backgrounds and experiences, and increase pupils' interaction in classrooms. However, the responding teachers exhibited different levels of response as regards benefits relating to the development of critical thinking, use of various stimuli and evaluation of all learning domains; these are given the lowest means.

Table 7.5 presents respondents' perceptions of the limitations of the existing science teaching methods in Qatari primary schools. The table suggests that these teaching methods do not promote participation, do not help pupils to understand science, do not relate science to real life and do not motivate pupils to learn better. As can be seen in Table 7.4 and Table 7.5, there is an inconsistency in teachers' responses regarding the benefits and limitations of existing teaching methods. Teachers gave contradictory answers to questions which were concerned with the same point. For example, they reported that the increasing of pupil interaction in classrooms is one of the main benefits of their teaching methods (item A1), while the most highly ranked disadvantage with their current teaching method is that it does not promote participation in the classroom (item B6). This issue will be addressed again in the discussion section.

Table 7.4 Means and standard deviations of the benefits of existing teaching methods as perceived by responding teachers

No.	Item	Mean	Standard deviation
A12	Relating science to real life in schools	3.38	.89
A9	Using pupils' backgrounds and experiences to build on	3.28	.93
A8	Paying attention to cognitive skills such as deduction and induction	3.24	.82
A1	Increasing pupils' interaction in the classroom	3.2	.93
A16	Suiting a large number of pupils	3.13	.69
A2	Making the lesson more exciting	3.12	.96
A15	Increasing the relationship between teacher and pupils	3.12	.45
A17	Matching the time allocated in school	3.07	.70
A14	Using external resources such as library and environment in addition to textbooks	3.07	1.01
A11	Increasing pupils' achievement	3.05	.98
A3	Controlling pupils' behaviour	2.97	.98
A4	Developing social skills such as co-operation and listening to others carefully	2.96	.80
A5	Enhancing pupils' motivation	2.94	.92
A10	Paying attention to motor skills such as building and writing	2.94	.95
A13	Evaluating all learning domains, cognitive, psychomotor and affective	2.84	.90
A7	Using various stimuli	2.81	.95
A6	Developing critical thinking	2.64	.91

Table 7.5 Means and standard deviations of the limitations of existing teaching methods as perceived by responding teachers

No.	Item	Mean	Standard deviation
B6	Does not promote participation in the classroom	3.60	.59
B12	Does not help pupils understand science	3.57	.63
B8	Does not relate science to real life	3.50	.78
B3	Does not motivate pupils to learn better	3.44	.71
B10	Does not use various stimuli	3.28	.71
B5	Focuses on the cognitive domain of learning only	3.14	.86
B11	Teacher does almost everything	2.82	.86
B13	Limits teachers' creativity	2.60	.72
B1	Does not promote critical thinking	2.56	.97
B7	Focuses on facts rather than on scientific progress	2.55	1.04
B2	Focuses on memorisation	2.51	1.06
B4	Transfers literally what is in the textbook	2.46	.84
B9	Evaluates pupils' memorisation	2.24	.81

Table 7.6 presents data on more general questions concerning the curriculum and classroom management which have relevance for co-operative learning. The highest three means are given to items suggesting that teachers like their pupils to work individually and quietly, are irritated by pupils talking to each other in the classroom, and complain that the

science curriculum is too demanding for them to adopt new teaching methods. By contrast, low means are given to items concerned with groupwork in classrooms, such as carrying out experiments in groups, allowing pupils to work in groups, and encouraging pupils to share materials and ideas in the classroom.

Table 7.6 Means and standard deviations of some general items relating to classroom management

No.	Item	Mean	Standard deviation
C12	I like my pupils to work individually and quietly	2.56	.96
C16	I am irritated by pupils talking to each other during my class	2.53	.98
C18	The science curriculum is too demanding to adopt new teaching methods. I need to continue using well-tried methods.	2.47	.95
C14	In my classes pupils help each other with their schoolwork	2.36	.88
C13	Pupils learn a lot from working with pupils with similar ability	1.93	.74
C15	In my classes I organise activities that require pupils to work in groups	1.80	.81
C20	I am considering allowing pupils to work in small groups in my classes	1.72	.78
C17	I like my pupils to share their ideas and materials with each other	1.88	.78
C19	I like my pupils to carry out scientific experiments in groups	1.64	.68
C11	Competing with other pupils is a good way for pupils to learn	1.44	.63

Table 7.7 shows that teachers have positive expectations as regards co-operative learning techniques. As can be seen, all items in the table have a mean value of over 2.5. Teachers seem to agree that co-operative learning would produce positive outcomes, such as increasing achievement, interaction and motivation.

Table 7.8 demonstrates that teachers have clear expectations as to the potential limitations of co-operative learning. Limitations suggested by teachers include the possibility of negative behaviour, the inappropriateness of school buildings to the method, and the

increasing demands made by the science curriculum on teachers, all of which may actually prevent teachers from adopting new teaching methods like co-operative learning.

Table 7.7 Means and standard deviations of expected benefits of co-operative learning as perceived by responding teachers

No.	Item	Mean	Standard Deviation
D9	Encourages pupils' self-learning	3.26	.71
D4	Enhances self-esteem	3.18	.98
D3	Develops social skills (co-operation, accepting others' point of view)	3.15	.98
D10	Develops the ability to enquire	3.09	.70
D2	Increases pupils' motivation	3.07	.98
D11	Increases pupils' interaction in the classroom	3.06	.63
D8	Develops better relationships among pupils	3.03	.97
D6	Improves pupils' attitudes towards learning	3.02	.97
D1	Increases pupils' achievement	2.91	.97
D5	Develops critical thinking	2.83	.93
D7	Improves pupils' behaviour	2.79	.99

Table 7.8 Means and standard deviations of expected limitations of co-operative learning as perceived by responding teachers

No.	Item	Mean	Standard deviation
E6	Increases negative behaviour in the classroom	2.89	.67
E4	Science curriculum is too demanding to adopt this teaching method	2.83	.64
E3	School buildings are not appropriate for small-group learning	2.75	.57
E5	Classrooms are too densely populated for this type of learning	2.75	.64
E2	Needs more tools and equipment than are available	2.73	.44
E1	Needs more time than that available for teaching science	2.67	.59

Table 7.9 presents data which show that teachers are concerned about the cultural difficulties in implementing co-operative learning in Qatari primary schools. They anticipate all the difficulties listed in the table, with the highest mean ratings being given to the item relating to parents being in favour of direct teaching methods and to parents' encouragement of their children to compete with others. By contrast, the lowest mean is given to teachers being used to competitive learning.

Table 7.9 Means and standard deviations of expected cultural difficulties in implementing co-operative learning as perceived by responding teachers

No.	Item	Mean	Standard deviation
F5	Parents prefer direct teaching methods rather than indirect methods	3.01	.50
F1	Parents encourage their children to compete with others	2.62	.97
F2	Society encourages competition	2.58	.90
F4	Pupils are used to competitive learning	2.58	.85
F3	Teachers are used to competitive learning	2.34	.81

Table 7.10 shows that teachers strongly expect resource-related difficulties in implementing co-operative learning. As can be seen, most items are given high means, especially the items relating to lack of adequate equipment and appropriate buildings designed for groupwork.

Table 7.10 Means and standard deviations of resource-related difficulties expected in implementing co-operative learning in Qatar as perceived by responding teachers

No.	Item	Mean	Standard deviation
G11	Insufficient equipment	3.48	.87
G14	Inappropriate buildings and classrooms not designed for small-group work	3.14	.94
G12	Lack of suitable books on co-operative learning	3.07	1.00
G15	Curriculum needs to be redesigned to match co-operative learning	3.04	.23
G16	Laboratories are not appropriate for co-operative learning	3.01	.24
G13	Lack of materials designed for co-operative learning	2.91	.98

Table 7.11 demonstrates teachers' concerns regarding pupils' behaviour in the classroom during groupwork. Only one item in the table is given a mean of 3.0, while all other items are given lower means.

Table 7.11 Means and standard deviations of expected behavioural difficulties in implementing co-operative learning in Qatar as perceived by responding teachers

No.	Item	Mean	Standard deviation
H4	Some pupils are reluctant to participate in groupwork	3.01	.87
H5	Teacher loses control over the classroom	2.66	.89
H2	Noise in the classroom increases	2.57	.88
H1	Disorder in the classroom increases	2.55	.94
H6	Off-task behaviour such as daydreaming and talking increases	2.34	.94
H7	High achievers might respond passively to group processes	2.23	.98
H3	One pupil might take over or control the group	2.11	.69

7.6 Principal components analysis

In order to investigate the factor structure underlying the teachers' perceptions of existing science teaching methods and co-operative learning, principal components analysis was carried out, with varimax rotation, on the complete sample of 151 primary school science teachers. The intercorrelation matrix for all 77 teachers' questionnaire items served as the starting point for a principal components analysis with varimax rotation, yielding a 27-factor solution. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was .51, while the Bartlett test of sphericity was 4541.3816, indicating that the data were probably not suitable for factor analysis. De Baus (1991) suggests that there are two main criteria for assessing whether a set of variables in a correlation matrix is suitable for factor analysis. One of them is Kaiser's criterion (KMO), which ranges from 0 to 1. The rule is simply to choose those factors which have an eigenvalue of greater than unity. If KMO yields high values above 0.7, then the correlations are sufficiently high to make factor analysis suitable. De Baus argues that more care should be taken if the KMO values are below 0.5, which means that factor analysis would be inadequate for that set of variables. Further, he suggests omission of variables that do not correlate well with others. As a result, all items which had coefficients smaller than 0.3 were dropped. Thirty items

remained, and were subjected to principal components analysis with varimax rotation. The factor solutions obtained from this reduced item pool yielded a ten-factor solution; all factor loadings were greater than 0.5, no variables appeared in more than one factor, and the eigenvalue was greater than 1.0. To avoid over-extraction, and since, beyond an eight-factor solution, each of the succeeding factors accounted for less than 3.6 per cent of the total variance, each of the varimax-rotated factor solutions from two to eight was examined to achieve the most simple structure and the most interpretable factor solution. It was found that the varimax-rotated eight-factor solution was the most interpretable. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was .70 while the Bartlett test of sphericity was 1885.7540 ($p<.001$), indicating that the data were suitable for principal components analysis. The principal components explain 54.1 per cent of the total variance.

The varimax-rotated eight-factor solution is presented in Table 7.12. In addition, the table presents the loading and communality of each item. Factor 1 (behavioural difficulties in implementing co-operative learning) accounted for 14.9 per cent of the variance, and included items suggesting the possibility of increased disorder in the classroom, pupils' being reluctant to participate in groupwork, and the teacher losing control over the classroom. This factor is seen not only as one of pupils' behavioural difficulties, though there are three highly loaded variables related to pupils, but rather as a general factor of behavioural difficulties with relevance for both teachers and pupils.

Factor 2 (limitations of existing teaching methods) accounted for 8.1 per cent of the variance and loaded on variables related to the limitations of existing teaching methods as perceived by teachers, including lack of pupil participation in the classroom, pupils' difficulties in understanding science appropriately and in relating science to real life, lack

of the use of various stimuli, and lack of motivation for pupils to learn better. It seems that Factor 2 is a general factor demonstrating the limitations of existing teaching methods. It covers a wide range of topics, such as participation, motivation, and teaching and understanding science.

Factor 3 accounted for 6.5 per cent of the total variance. High loaded variables are concerned with existing teaching methods and memory, including focusing on the memory level of learning, memorising facts, and ignoring critical thinking. It is evident that all variables in this factor are highly loaded and are concerned with a major aspect of existing teaching methods in Qatari primary schools, namely the focus on recalling factual information.

Factor 4 (6.1 per cent of the variance) contains items with high loading representing teachers' commitment to co-operative learning, including their willingness to use co-operative learning in classrooms and laboratories and their acceptance of the idea of pupils sharing ideas and materials.

Factor 5 accounts for 5.5 per cent of the variance; loaded variables present the benefits of existing teaching methods as perceived by teachers, including enhanced motivation, increased pupil interaction and achievements, and more exciting lessons.

Factor 6 (co-operative learning and its effect on pupils) accounts for 4.7 per cent of the total variance and includes variables relating to pupils' relationships and behaviour in the classroom. This is a general factor indicating the importance of the social and behavioural effects of co-operative learning on pupils.

Table 7.12 Principal components analysis with 8-factor solution

	Variable	Loading	Communality
Factor 1:	*Behavioural difficulties in implementing co-operative learning*		
H1	Increases disorder in the classroom	.81704	.73369
H2	One pupil might take over or control the group	.79033	.68685
H5	Teacher loses control over the classroom	.77177	.63300
H4	Reluctance of some pupils to participate in groupwork	.74605	.68379
Factor 2:	*Limitations of existing teaching methods*		
B6	Does not promote participation in the classroom	.78415	.64657
B12	Does not help pupils understand science	.74843	.61475
B8	Does not relate science to real life	.66413	.53307
B10	Does not use various stimuli	.59269	.48316
B3	Does not motivate pupils to learn better	.51441	.42125
Factor 3:	*Traditional teaching methods and memory*		
B2	Focuses on memory	.79316	.73032
B7	Focuses on facts rather than on scientific processes	.79276	.70120
B1	Does not promote critical thinking	.73724	.66795
B9	Evaluates pupils' memory	.73684	.63736
Factor 4:	*Commitments to co-operative learning*		
C20	I am considering allowing pupils to work in small groups in my classes	.78088	.63853
C15	In my classes I organise activities that require pupils to work in groups	.73948	.63777
C19	I like my pupils to carry out scientific experiments in groups	.73651	.60482
C17	I like my pupils to share their ideas and materials with each other	.62226	.47549
Factor 5:	*Benefits of existing teaching methods*		
A5	Enhancing pupils' motivation	.67485	.52988
A2	Making the lesson more exciting	.66964	.51543
A1	Increasing pupils' interaction in the classroom	.65970	.48853
A11	Increasing pupils' achievement	.64490	.59187
Factor 6:	*Co-operative learning and affect domain of pupils*		
D8	Develops better relationship among pupils	.72377	.62313
D7	Improves pupils' behaviour in the classroom	.63923	.50043
Factor 7:	*Cultural obstacles to co-operative learning*		
F2	Society encourages competition	.68338	.57370
F1	Parents encourage their children to compete with other pupils	.61691	.46650
F3	Pupils are used to competitive learning	.50916	.45528
Factor 8:	*Resources and training*		
I2	Adequate resources should be made available to teachers to try out new teaching methods	.67395	.55386
G1	Inadequate equipment	.62836	.53335
I1	Teachers should be trained to use new teaching methods	.60027	.46072
G2	Need for more tools and equipment than currently available in schools	.53600	.49259

Factor 7 accounts for 4.4 per cent of the total variance, the loaded variables including parents' and society's encouragement of pupils to compete, and pupils being used to competitive learning. This factor suggests that society, parents, and pupils themselves could all represent obstacles to co-operative learning.

Factor 8 (3.9 per cent of the variance) loaded on variables connected with resource- and training-related difficulties in implementing co-operative learning. This factor highlights the problem of inadequate resources and training which might create obstacles to the implementation of co-operative learning.

7.7 Comparisons between groups of teachers

The aim in comparing groups of teachers was to see whether selected groups of teachers differed in their perceptions regarding existing teaching methods and co-operative learning. The eight sub-scales obtained from principal components analysis were used as dependent variables. Independent variables were obtained from the information provided by the teachers themselves. As stated earlier, one-way analysis of variance incorporating Tukey's comparison and t-tests was used to test for differences between the mean rating of teachers.

The results are shown in Table 7.13. Interestingly, only three significant differences appear in the table. As can be seen, the only significant difference between male and female teachers was that the former had a higher mean rating on commitment to co-operative learning. On the other hand, Tukey's test revealed a significant difference between teachers who had six to ten years' experience and teachers with more than ten years' experience as regards commitment to co-operative learning. Teachers with more than ten

years' experience had a much higher mean rating than teachers with one to five years' experience. Similarly, on the factor connected with resource-related obstacles to co-operative learning Tukey's test gave teachers who had one to five years' experience a significantly higher mean rating than teachers with six to ten years' experience.

Table 7.13 Differences between selected groups of teachers on selected variables

Variables	Sex	Nationality	Age	Experience	Degree
Key	a = male b = female	a = Qatari b = non-Qatari	a = 20–29 b = 30–40 c = >40	a = 1–5 b = 6–10 c = >10	a = lower than B.Sc. b = B.Sc. c = higher than B.Sc.
Behavioural difficulties in implementing co-operative learning	(a) 2.67 (b) 2.75 NS	(a) 2.72 (b) 2.69 NS	(a) 2.68 (b) 2.78 (c) 2.68 NS	(a) 2.58 (b) 2.87 (c) 2.75 NS	(a) 2.94 (b) 2.67 (c) 2.56 NS
Limitations in existing teaching methods	(a) 3.45 (b) 3.53 NS	(a) 3.49 (b) 3.50 NS	(a) 3.49 (b) 3.49 (c) 3.50 NS	(a) 3.41 (b) 3.64 (c) 3.49 NS	(a) 3.48 (b) 3.50 (c) 3.49 NS
Existing teaching methods and memory	(a) 2.46 (b) 2.46 NS	(a) 2.42 (b) 2.57 NS	(a) 2.48 (b) 2.40 (c) 2.53 NS	(a) 2.39 (b) 2.29 (c) 2.65 NS	(a) 2.55 (b) 2.42 (c) 2.61 NS
Commitment to co-operative learning	(a) 1.95 (b) 1.52 p<.03 (a>b)	(a) 1.63 (b) 1.89 NS	(a) 1.64 (b) 1.72 (c) 1.81 NS	(a) 1.71 (b) 1.52 (c) 1.83 P<.03 (c>b)	(a) 1.73 (b) 1.68 (c) 1.86 NS
Benefits of existing teaching methods	(a) 2.98 (b) 3.10 NS	(a) 3.12 (b) 2.88 NS	(a) 3.14 (b) 3.00 (c) 2.95 NS	(a) 3.13 (b) 3.06 (c) 2.96 NS	(a) 3.02 (b) 3.08 (c) 2.86 NS
Co-operative learning and affect domain of pupils	(a) 2.72 (b) 2.49 NS	(a) 2.53 (b) 2.72 NS	(a) 2.57 (b) 2.58 (c) 2.64 NS	(a) 2.62 (b) 2.43 (c) 2.66 NS	(a) 2.67 (b) 2.57 (c) 2.59 NS
Cultural obstacles to co-operative learning	(a) 2.98 (b) 3.05 NS	(a) 3.03 (b) 2.98 NS	(a) 3.01 (b) 3.03 (c) 3.01 NS	(a) 2.92 (b) 3.04 (c) 3.11 NS	(a) 3.10 (b) 3.00 (c) 3.02 NS
Resource-related obstacles to co-operative learning	(a) 1.78 (b) 1.94 NS	(a) 1.93 (b) 1.73 NS	(a) 1.91 (b) 1.87 (c) 1.78 NS	(a) 1.96 (b) 1.79 (c) 1.84 p<.04 (a>b)	(a) 1.86 (b) 1.87 (c) 1.93 NS

It should be stressed, however, that these three signficant differences should be viewed with caution, because these differences might be attributed to a 'type-1' error. This type of error refers to the rejection of a true hypothesis. Nachmias and Nachmias (1987) state:

> The probability of rejecting a true hypothesis – a type-1 error – is defined as the level of significance. Thus, in the long run, an investigator employing the .05 level of significance will falsely reject 5 per cent of the true hypotheses he or she tests. (p. 498)

In our case, as Table 7.13 shows, we examined 40 possibilities of difference (8 factors by 5 variables), at a .05 level of significance. The probability of committing a type-1 error is 5 per cent. This means that there is a probability of the data presented in Table 7.13 incorporating type-1 error.

7.8 Issues arising from the teachers' questionnaire

This section discusses some interesting and surprising findings which emerged from analysis of the teachers' questionnaire. One of these concerns the main teaching methods used by primary school science teachers in Qatar. The responses teachers gave on this point were very interesting, in that the researcher expected that most teachers (more than 85 per cent) would state that lecturing was the teaching method used in Qatari primary schools. However, only 61.6 per cent of teachers said this. This seems to be inconsistent with the researcher's own experience, observation, and conclusions from casual conversation with teachers in Qatari primary schools. In order to find out the real practice of science teachers in Qatari primary schools, then, a triangulation method (i.e. observation and interviews) should be used. This should increase the credibility of the findings and resolve the conflict.

Another point of interest concerns teachers' commitment to co-operative learning. The finding that male teachers show greater commitment to co-operative learning seems to be

inconsistent with evidence from Table 7.2 that female teachers are more likely to use small-group learning. This suggests that different data collection methods, such as observation, should be used to investigate teachers' practices in the classroom rather than the questionnaire. Another possibility is that male teachers answered honestly when they were asked about their practice, while females tried to give the answer they thought the researcher would like to hear when they were asked about commitment to co-operative learning. The cultural context in which the research took place may have played a role here: it may be that the women in the study would have responded more openly to a female researcher.

Interestingly, teachers had highly positive expectations regarding co-operative learning. They agreed that co-operative learning would produce positive outcomes, such as increasing interaction, motivation and achievement. This may be because co-operative learning is a new teaching method for them, and so they are according it more value. Another possible reason is that some teachers may have heard about co-operative learning from an American source: most of the American literature focuses upon the positive outcomes of co-operative learning, while ignoring its disadvantages and limitations.

Surprisingly, the comparisons between groups of teachers on selected variables revealed only three significant differences, one related to sex and two to experience. No differences were found that related to nationality (Qatari/non-Qatari), age or academic qualifications. This suggests that most teachers responded to the questionnaire in the same way. This is perhaps because most (107) teachers were Qatari, had the same degree (B.Sc.), and graduated from the same teacher training programme at the University of Qatar. It should

be mentioned that the University of Qatar is the only establishment in the state of Qatar which offers degrees for teaching in any subject.

By way of conclusion, the reasons should be given here regarding why the researcher did not attempt to answer the questions arising from the teachers' questionnaire. There were two such reasons:

1. Time constraints made it impossible to complete analysis of Stage 1 before starting to collect data for Stages 2 and 3.
2. Even if time had been available, the researcher was required by the Ministry of Education to carry out an experimental study of the effect of co-operative learning. It would not have been possible for him to change the whole emphasis of the research by investigating the anomalies arising from analysis of Stage 1.

Nevertheless, the results of Stage 1 of the teachers' questionnaire indicate some very important lines of inquiry for further research.

Chapter 8

Evaluation of the Training Programme

8.1 Introduction

This chapter evaluates the training programme designed by the researcher to train teachers to use co-operative learning in classrooms. The aim of the training programme was to ensure that teachers understood and acquired the concepts of and skills involved in co-operative learning. To achieve this objective teachers were asked to keep a diary on a daily basis throughout the workshops. The training programme included: a discussion of the traditional teaching methods in the Arab world, with special reference to Qatar; a presentation on new trends of teaching science for primary schools, with particular reference to co-operative learning; a critical discussion of literature on co-operative learning techniques; and development of skills necessary for implementing co-operative learning in classrooms (for more details see Appendix 11). The following sections are concerned with the procedures which were followed in collecting the data, the method of analysis, and the presentation of data.

8.2 Procedures

In the training programme teachers were asked to write up their diaries after each of the six workshops. The main objectives in using this technique were to collect data relating to teachers' perceptions of the training programme, to find out what difficulties teachers encountered in training to use co-operative learning, and to find

out what difficulties they anticipated in implementing co-operative learning in classrooms.

A sample of seven male primary school science teachers was chosen (as stated in the methodology chapter) to participate in a training programme using co-operative learning in practice. Five of the seven teachers were Qatari and two non-Qatari; the teachers were aged between 28 and 48. They were all university graduates, and had from four to nineteen years' teaching experience. These teachers were asked to report impediments, problems and dilemmas that they encountered during the process of being trained to use co-operative learning in classrooms. They were also asked to write about the difficulties they expected to encounter in implementing co-operative learning, to suggest coping strategies for overcoming these difficulties, and to identify the advantages and disadvantages of using existing teaching methods in Qatari primary schools. Finally, they were asked to record their feelings, observations, and reflections on a daily basis (see Appendix 9). Teachers were given 45 minutes after each workshop to write up their diaries. At the end of the workshop the diary entries were collected for analysis. The researcher expected to receive 42 diary entries. However, only 33 entries were received at the end of the workshop. As a result, the researcher contacted by phone the teachers who had not handed in their diaries to remind them. One week later another four entries were received. Eventually 37 entries, representing 88 per cent of the total number of expected entries, were received.

The University of Qatar provided a large, comfortable, and fully-equipped room in which to conduct the workshop training programme. Participants were informed in advance of the place, time and date of the workshop. Similarly, arrangements were made in advance with the Ministry of Education and school principals to release teachers from duties, and signposts were placed at strategic points so that teachers could easily locate the workshop room. Refreshments, and writing materials, were available throughout the workshop.

The site of the workshop was divided into five parts: a resource centre, a refreshment centre, a stationery centre, a reference material centre and a group processing centre. On the first day of the workshop each participant was given a folder containing a welcoming letter, blank sheets for note-taking, a list of objectives for the workshop and a timetable. Efforts were made to keep to a precise timetable. The Education Research Centre provided the researcher with an assistant for the duration of the workshop. All these arrangements made it possible for the workshop to achieve its objectives. Teachers were, throughout, satisfied with the organisation of the workshop, and this helped the researcher to lead the workshop smoothly.

8.3 Method of analysis

There are a variety of approaches to analysing qualitative data. Miles and Huberman (1984) state the following:

> Despite a growing interest in qualitative studies, we lack a body of clearly defined methods for drawing valid meaning from qualitative data. We need methods that are practical, communicable, and not self deluding: scientific in the positivists' sense of the word, and aimed toward interpretative understanding in the best sense of that term. (p. 20)

With this in mind, Miles and Huberman (1994) attempted to develop an interactive model of data analysis. They define analysis as consisting of three major streams of activity: data reduction, data display, and conclusion drawing/verification. They describe the three flows of activity as follows:

> Data Reduction: Refers to the process of selecting, focusing, simplifying, abstracting and transforming the data that appear in written-up field notes or transcriptions ... As data collection proceeds, further episodes of data reduction occur (writing summaries, coding, testing out themes, making clusters, making partitions, writing memos. The data reduction/transforming process continues after fieldwork, until the final report is completed.
>
> Data Display: The second major flow of analysis activity is data display. Generically, a display is an organised, compressed assembly of information that permits conclusion drawing and action ...
>
> Looking at displays helps us to understand what is happening and to do something – either analyse further or take action – based on that understanding. (pp. 10–11)
>
> Conclusion Drawing/Verification: The third stream of analysis activity is conclusion drawing and verification. From the start of data collection, the qualitative analyst is beginning to decide what things mean – is noting regularities, patterns, explanations, possible configurations, causal flows, and propositions. The competent researcher holds these conclusions lightly, maintaining openness and scepticism, but the conclusions are still there, inchoate and vague at first, then increasingly explicit and grounded. (p. 11)

After providing this general model for dealing with qualitative data, Miles and Huberman (1994) identify many methods of analysing qualitative data, such as via a contact summary sheet, codes and coding, case analysis meeting, pattern coding, interim case summary and prestructured case analysis. Table 8.1 provides a brief description of these methods.

With the general model in mind, the researcher should then select the method that can best define the data in relation to the main research questions. The prestructured case analysis method was selected for use in analysing the teachers' diaries, because the

teachers' diaries were connected with the investigating of a predetermined question with a particular number of teachers.

Table 8.1 Methods of analysing qualitative data (from Miles and Huberman, 1994)

Method	Brief description
Contact summary sheet	A contact summary is a single sheet with some focusing or summarising questions about a particular field contact. The field-worker reviews the written-up field notes and answers each question briefly to develop an overall summary of the main points in the contact (p. 51).
Codes and coding	Coding is analysis. To review a set of field notes, transcribed or synthesised, and to dissect them meaningfully, while keeping the relations between the parts intact, is the stuff of analysis. This part of the analysis involves how you differentiate and combine the data you have retrieved and the reflections you make about this information. Codes are tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study. Codes usually are attached to 'chunks' of varying size words, phrases, sentences or whole paragraphs, connected or unconnected to a specific setting. They can take the form of a straightforward category label or a more complex one (e.g. a metaphor) (p. 56).
Case analysis meeting	At case analysis meeting, the field-worker most conversant with a case meets with one or more people – a critical friend, a colleague, or co-researcher – to summarise the current status of the case. The meeting is guided by a series of questions, and notes are taken on answers to the questions as the meeting progresses (p. 76).
Pattern coding	Pattern codes are explanatory or inferential codes, ones that identify an emergent theme, configuration, or explanation. They pull together a lot of material into meaningful and parsimonious units of analysis. They are a sort of meta-code. First-level of coding is a device for summarising segments of data. Pattern coding is a way of grouping those summaries into a smaller number of sets, themes or constructs (p. 69).
Interim case summary	The interim case summary is a provisional product of varying length (10–25 pages) that provides a synthesis of what the researcher knows about the case and also indicates what may remain to be found out. It presents (a) a review of findings, (b) a careful look at the quality of data supporting them, and (c) the agenda for the next waves of data collection. The summary is the first attempt to derive a coherent, overall account of the case (p.79).
Prestructured case analysis	Assuming that the researcher has established an explicit conceptual framework, a rather precise set of research questions, and a clearly defined sampling plan, the prestructured case begins with a case outline, developed before any data is collected. The outline includes detailed data displays, as well as a narrative section accompanying them. The outline is in effect a shell for the data to come. Over several rounds of field visits, the researcher fills in successive drafts of the case, revising steadily; the final version of the case is ready shortly after the last field visit (p.84).

In other words, the researcher established a clear outline for the sort of data he wanted before any data were collected. The prestructured case analysis method starts with case outlines, established before any data are collected. Miles and Huberman (1994) state:

> With the outline clearly in mind, the researcher begins the first round of data collection. The raw field notes are coded without being transformed into write-ups. The researcher reviews the coded field notes and enters data into displays. (p. 84)

Figure 8.1 defines the sequence of the prestructured case analysis method as suggested by Miles and Huberman (1994).

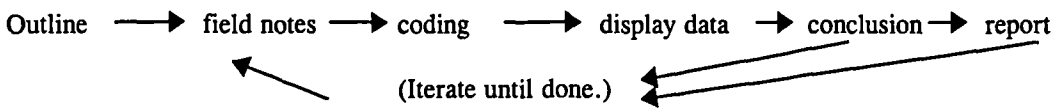


Figure 8.1 Prestructured Case Analysis Sequence (Source: Miles and Huberman 1994, p. 85)

In the training programme, teachers were given a number of open-ended questions, their responses to which were to form the content of the teachers' diaries (see Appendix 9). For example, at the first workshop teachers were asked to address the following questions:

- Are there any problems with existing teaching methods? What are they?
- What coping strategies can be employed to deal with these problems?
- Which problems are technical, which cultural, and which administrative in nature?
- What problems did you encounter while being trained to use co-operative learning in practice?
- What are your feelings about and reflections on today's workshop?

Different sets of questions were given to teachers on the second, third, fourth, fifth and sixth days of the workshop (see Appendix 9). However, questions 4 and 5 were the same every day. The results of the analysis are presented in the sections which follow. Because the diary entries were simple and short, only basic coding and summary were required.

8.4 Presentation of the qualitative data

The following sections present the data from the teachers' diaries as kept throughout the training programme. Teachers' initials were used to present data rather than their real names, for reasons of confidentiality. In order to maintain consistency in the presentation of data and clarity, the tables in the following sections present items categorised under codes and sub-codes generated by the researcher from teachers' diary entries. The researcher used his own words to summarise the points arising from the teachers' diary entries. On the other hand, he used language specialists to translate into English the teachers' views, which were expressed in Arabic. These views are presented as quotations in the text.

8.4.1 Day 1

The first day of the workshop (11 September 1994) was concerned with discussing existing teaching methods in terms of definitions, advantages, disadvantages, problems and strategies for overcoming the problems. Teachers were also asked to record their feelings about and reflections on the workshop. The results may be summarised as follows. Teachers were enthusiastic about the first day of the workshop. Some teachers made remarks relating to the nature of the interaction and

discussion at, and the duration of, the workshop, while others commented on the organisation of the workshop. The following comments were made:

> This is the first time for a number of years that such problems have been discussed freely and without prejudice to the point of view of any of the participants. (YH, p. 2, ll. 24–8)
>
> I am pleased to be in this workshop as I got acquainted with new colleagues and gained a number of new ideas to implement in my classroom. Moreover, I think that this workshop is well-prepared, well-organised and well-managed. (NA, p. 2, ll. 14–21)
>
> This workshop was a new experience for me, where a set of ideas, problems, and possible solutions were discussed. (AN, p. 2, ll. 18–23)
>
> This workshop is good and practical as we got acquainted with new colleagues and listened to new ideas. (AM, p. 2, ll. 15–17)
>
> At this workshop I gained an opportunity to think about some teaching problems, and possible solutions. Moreover, working in groups was very helpful in saving time and accomplishing the tasks. (SA, p. 2, ll. 12–15)

The remaining two teachers commented briefly on the workshop, one saying that it was good, and the other that it was 'more than excellent'.

Three teachers commented on the duration of the workshop and the nature of the discussion:

> The time available was not sufficient for discussing, evaluating and writing down the ideas. (AM, p. 2, l. 20)
>
> Some participants were conservative to some extent in expressing their opinions and ideas. (HA, p. 2, l. 21)
>
> The workshop was limited as regards number of hours but concentrated as regards content. (AN, p. 2, ll. 22–3)

The teachers' diaries from the first day also discussed the following question: is there a real problem with existing teaching methods in Qatari primary schools and if so, what is it? Interestingly, all the teachers agreed that there is a real problem with existing teaching methods, namely that teachers are reluctant to employ any teaching methods other than the traditional one of lecturing. It seems that teachers have a clear

understanding about what constitutes traditional teaching methods. Teachers made the following remarks:

> There is a real problem with existing teaching methods as they are traditional methods which do not increase creativity, develop mental ability, and link information to real life. This practice is similar to the common method of teaching by 'Kuttabs' in the old days in Qatar. (HA, p. 1, ll. 3–7)

> The problem exists, and that is because traditional teaching methods depend on the technique of the lecture. (MM, p. 1, ll. 2–3)

> Teaching methods in Qatari schools depend completely on theoretical teaching of information. (AM, p. 1, ll. 2–4)

> Existing teaching methods focus on the repeating of factual information by pupils. (NA, p. 1, ll. 2–4)

> The teacher follows the same path as his teachers followed, i.e. the delivering of information. (HY, p. 1, ll. 7, 9–10)

The above remarks provide additional evidence that the results of the teachers' questionnaire should be viewed with caution. Another focus of the teachers' diaries for the first day was on the reasons for teachers using traditional teaching methods in classrooms. Table 8.2 shows that teachers put forward a great many arguments to justify their use of traditional teaching methods. These varied from technical and administrative to cultural and behavioural, and reasons connected with resources. The table shows that most teachers agree that lack of tools and equipment is one of the main reasons for their using traditional teaching methods, as these methods do not require many resources. Another reason many teachers agreed on is that classrooms are overcrowded, which forces teachers to use the lecturing method. The table also shows that some teachers blame school administrators for lack of co-operation with teachers in adopting new teaching methods.

Table 8.2 Reasons for using traditional teaching methods in schools as perceived by participating teachers

Reasons	No. of teachers
Reasons connected with resources and training	
• Lack of tools, equipment and other resources, which hinders the use of new teaching techniques.	5
• Weakness in teachers' preparation and training, which means teachers continue to adopt traditional teaching methods.	2
Technical reasons	
• The density of the syllabus obliges the teacher to adopt the lecturing method in order to complete the syllabus.	2
• The time available for teaching is not adequate for achieving what is expected of the teacher in class.	3
• Examinations in schools mainly focus on the cognitive side and measure pupils' capacity for memorisation.	1
Cultural reasons	
• Lack of interest of a large proportion of teachers, particularly Qatari teachers, in the teaching profession.	1
• Pupils in all subjects and at all stages being used to memorising information.	1
• Lack of appreciation of teachers' efforts, with those who are innovative and those who are not being appreciated equally.	1
Administrative reasons	
• Lack of co-operation between administrators and teachers in developing and improving teaching methods.	4
• The focusing of school administrators on the quantitative success of pupils, regardless of qualitative criteria.	
• The burdens placed on the teachers inside the school, such as the large number of periods, administrative work, supervision and school activities.	1
Behavioural reasons	
• Overcrowded classrooms make lecturing the best method for controlling the class.	5
Other reasons	
• Lecturing is the easiest and fastest method for teaching any subject.	1

Table 8.3 indicates a number of strategies which were suggested for improving existing teaching methods. These strategies covered a wide area, including resources, training, administration and technical criteria. Most of the teachers appeared to agree that providing sufficient tools and equipment is very important. Some teachers stressed the importance of reducing the number of pupils in each classroom so teachers could be more creative and help pupils more effectively.

Table 8.3 Suggested strategies for improving existing teaching methods

Reasons	No. of teachers
Resources and training strategies	
• Training teachers to employ new teaching methods in schools.	1
• Providing more equipment and tools to enable the teacher to involve pupils in conducting the experiments.	4
Administrative strategies	
• Increasing co-operation between school administration and teachers, to improve teaching methods and to avoid interference by administrators in teachers' teaching methods.	2
• Lessening the administrative and supervisory responsibilities of teachers so that they can concentrate on helping pupils.	2
Technical strategies	
• Designing school examinations that measure all learning domains: cognitive, affective and motor-skill.	1
• Revising the syllabus and how it is organised, and reducing its density so as to match the time available for teaching it.	2
Other strategies	
• Looking again at the entire education system to find out solutions to these problems.	3
• Decreasing the number of pupils in class so as to help the teacher to be creative and to give all pupils what they need.	3

8.4.2 Day 2

The second day of the workshop (12 September) dealt with teachers' reflections on the activities of that day, and the difficulties they encountered in training to use co-operative learning techniques. Teachers expressed different opinions about the second day of the workshop. Some focused on the advantages co-operative learning offered in helping them absorb new ideas and skills, while others focused on the benefits of experiencing co-operative learning through working in groups in the workshop. One teacher said:

> The idea of co-operative learning began to appear through a recognition of its essential components, such as interdependence. The activities we practised helped us understand and grasp the idea. (HN, p. 2, ll. 2–5)

The other teachers commented as follows:

> The discussion was much better than on the first day. The idea of co-operative learning began to be clearer to the participant. (HA, p. 2, ll. 7–9)
>
> Through the various activities of the day I acquired a group of concepts and skills related to co-operative learning from the point of view of forming groups and assigning pupils to groups. (SA, p. 2, ll. 3–9)
>
> From the activities we engaged in and the handouts I could understand the meaning of co-operative learning. (AM, p. 2, ll. 15–7)
>
> I had already heard about learning in groups and I think that this is a real opportunity to become acquainted with this method, closely and practically. (YH, p. 2, ll. 25–8)
>
> I acquired a group of concepts and skills relating to co-operative learning through working in groups. (NA, p. 2, ll. 2–3)
>
> Today's workshop made a very good impression on me. (MM, p. 1, l. 21)

The teachers' diaries also dealt with the question of what difficulties the teachers encountered while being trained to use co-operative learning in practice. Table 8.4 shows that teachers were concerned about the implementation of co-operative learning in classrooms, as it requires effective preparation and real practice if it is to fulfil its potential.

Table 8.4 Difficulties teachers encountered in understanding the concepts and acquiring the skills of co-operative learning

Difficulties	No. of Teachers
• There were no difficulties in the process of understanding/acquiring the concepts and skills of co-operative learning. However, some difficulties may occur in its implementation.	3
• The activity sheets given in the workshop do not contain enough information.	1
• Some of the skills presented need to be practised extensively before they can be used successfully.	1
• Since the information presented is new it needs time and effort to be assimilated.	1
• The teacher must take into consideration a great many variables, meaning extra expenditure of effort.	2
• The teacher's role in co-operative learning is not clear, which is worrying for the teacher.	1
• How individuals and groups may be assessed is yet to be clarified.	1

8.4.3 Day 3

The diaries from the third day (13 September) were concerned with teachers' feelings and reflections and the difficulties they experienced in achieving interdependence in groups and in planning co-operative learning lessons. On the third day of the workshop the teachers continued to express enthusiasm for co-operative learning techniques. However, some teachers indicated their concerns about the implementation of co-operative learning. For example, one of the teachers asserted:

> Insight into the real essence of co-operative learning started to gel, theoretically and practically, a short time after the start. The final judgement could be made only after full application. (YH, p. 1, ll. 18–24)

Another teacher commented as follows:

> I have acquired new concepts of co-operative learning as well as new skills in lesson planning via this approach. (SA, p. 2, ll. 3–5)

Another teacher expressed his reflections in more detail, as follows:

> Today, I have seen a new method of group teaching by video. It shows how working in groups can be extremely enjoyable, practical and useful. Moreover, I enjoyed working in groups to plan lessons. However I do not think that this method can be thoroughly applied as it requires a lot of time and effort, not only on the teacher's part but on various other bodies' as well, such as the school administration and the Ministry of Education. On the other hand, I think that there are some aspects of this method which could be put into effect through the individual teacher's effort and ingenuity. (NA, p. 2, ll. 3–13)

A fifth teacher described the workshop as 'good', while the remaining teachers offered no comments. After teachers had seen a videotape on teaching science using co-operative learning, had designed lessons and had become familiar with the elements of co-operative learning, they were asked to write about what difficulties they expected in implementing co-operative learning. Table 8.5 shows that, again, the teachers foresaw difficulties in providing sufficient tools and equipment. Moreover, they were concerned about the time available to teachers for completing the syllabus, thinking it insufficient to take on board co-operative learning. It is worth noting that teachers made a large number of comments in response to the above question, with the largest number of comments relating to pupils' interaction and participation in the classroom.

Table 8.5 Difficulties participants expected to encounter in implementing co-operative learning

Expected difficulties	No. of teachers
Interaction and participation	
• Pupils' reluctance impedes the realisation of interdependence in groupwork.	1
• The difficulty of placing pupils in harmonious groups can adversely affect pupils' group interaction, which in turn can affect achievement.	1
• A pupil may not appreciate the contribution made by his peers' roles.	2
• Pupils' preferences for taking up certain roles can make them reluctant to participate actively when they are not given these roles.	1
• Some negative interaction may result from pupils' divergent levels of ability. High achievers may ridicule lower ones.	1

Table 8.5 (cont.)

Expected difficulties	No. of teachers
Pupils' relationships	
• Some pupils prefer to work on a friendly basis. This does not usually work.	1
• The weakness of the relationship between pupils hinders their co-operating from the outset.	1
• A group's highest achievers may overpower their peers, pushing lower achievers into dark corners.	1
Time and training	
• Pupils need to expend a great deal of time and effort to assimilate and perfect their roles in their groups.	1
• In co-operative learning, lesson planning requires much more time and effort than with the traditional approaches. The teacher's burdens are increased.	2
• The time allocated to a science lesson is too short for the teacher to design a complete lesson in compliance with the co-operative learning method.	3
Aids and tools	
• Lack of aids and tools stands in the way of planning a good co-operative learning lesson.	3
Skills	
• The numerous factors and variables which the teacher must take into consideration when planning a lesson might cause some problems.	1
• It is much simpler to plan a theoretical lesson in co-operative learning than an action one.	1
Curriculum	
• The school science syllabus has not been designed with reference to groupwork. Therefore no change could be made to the syllabus without the prior approval of school administrators and the Ministry of Education.	1

8.4.4 Day 4

The fourth day of the workshop (14 September) involved conducting microteaching lessons. Teachers were then asked to evaluate the lessons, in terms of the positive aspects and the limitations of implementing co-operative learning, on a small scale.

Table 8.6 indicates the positive aspects reported by teachers. It shows that both teachers and pupils were enthusiastic about experiencing co-operative learning. Table 8.7 presents the limitations of microteaching lessons. As can be seen, most teachers agreed that pupils needed time and practice to understand and adopt the different ideas. Moreover, they also needed time and practice in order to achieve a rapport with each other.

Table 8.6 Evaluation of the microteaching lessons: advantages as perceived by participants

Expected difficulties	No. of teachers
Enthusiasm	
• Teachers conducted the co-operative learning lessons unhesitatingly and with great confidence.	3
• Pupils were enthusiastic, as was demonstrated by their interaction and co-operation throughout the lessons.	3
Skills	
• Teachers interacted with pupils and attempted to achieve most of the objectives of co-operative learning.	3
Resources	
• Tools necessary for the successful implementation of the lessons were available.	2
• The classroom was quite large and suitable for co-operative learning.	1

8.4.5 Day 5

The fifth day of the workshop (15 September) involved teachers gaining greater understanding of the procedures for implementing co-operative learning in classrooms. In addition, teachers were asked to record the potential advantages of and difficulties in implementing co-operative learning in practice. Table 8.8 demonstrates

the advantages of using co-operative learning as reported by teachers. The table shows that increasing participation, developing social skills, changing teachers' traditional roles and increasing pupil achievement were among the items frequently reported.

Table 8.7 Evaluation of the microteaching lessons: limitations as perceived by participants

Expected difficulties	No. of teachers
Relationships	
• Rapport among the pupils was not achieved at the beginning of the lesson since the pupils did not know each other.	5
Skills	
• Pupils were confused about their roles in the first lesson and it was some time before they could understand them.	5
• Teachers did not keep encouraging pupils to interact and share materials and ideas.	2
• Most teachers applied the lecturing approach, particularly in the first lesson, out of sheer habit.	3
• Some teachers failed to take on the role of a co-operative learning teacher.	3

Table 8.9 presents the potential difficulties in implementing co-operative learning. As can be seen, teachers reported a large number of difficulties and obstacles in taking on board co-operative learning. It may be noted also that teachers are concerned about: cultural difficulties, including pupils being used to traditional teaching methods; resource-related difficulties, including the lack of tools and equipment to engage in groupwork; and behavioural problems, including difficulties in controlling and managing pupils' behaviour in the classroom.

Table 8.8 Potential advantages of co-operative learning

Expected difficulties	No. of teachers
Participation and co-operation	
• Pupils' classroom interaction and participation are increased.	2
• Negative competitive tendencies among pupils, which delimit co-operation, are replaced by positive interaction.	1
Social and mental skills	
• Pupils' research and inference skills are enhanced.	1
• Pupils' social skills such as co-operation and communication are developed.	1
• Pupils are trained to adopt responsibilities and to be self-reliant.	1
• Pupils' decision-making skills are developed.	1
• Pupils' relationships are improved.	1
Teachers' roles	
• The teacher is given more important roles to employ than in traditional learning methods.	2
Achievement	
• Co-operative learning increases pupil achievement.	2

8.4.6 Day 6

The sixth day of the workshop (17 September) was concerned with evaluating the training programme in terms of how it was prepared, its organisation, content and duration. Also, participants were asked to suggest how the training programme might be improved. Table 8.10 presents the teachers' evaluation of the training programme. It shows that teachers were generally satisfied with the training programme with respect to preparation, organisation, content and duration. Interestingly, some teachers made adverse remarks relating to content and duration. For example, some teachers suggested that the programme should pay more attention to practical skills such as

planning lessons and evaluating individual and group products. Moreover, some suggested that more time should be given to microteaching lessons.

Table 8.9 Potential difficulties in implementing co-operative learning

Expected difficulties	No. of teachers
Resources	
• There is insufficient equipment and tools for groupwork.	5
• Laboratories and classrooms are not suited to this type of teaching. Neither the space nor the facilities are appropriate.	4
• It is difficult for one teacher to do the whole job. S/he needs aids and a laboratory assistant to cope properly.	1
Participation and interaction	
• Pupils may be reluctant to interact or participate in the learning process.	2
• High achievers might respond negatively to the process of groupwork, thinking it might affect their marks adversely.	1
• Backward pupils may depend on their peers and so not participate or interact.	1
Behaviour and control	
• There may be difficulty in controlling and managing the class because of the large number of pupils.	4
• Some pupils especially high achievers and older pupils in groups, may dominate.	2
Administration and supervision	
• Interference by school administrators in the process of teaching may hinder the application of groupwork.	1
• Will the Ministry of Education accept such a technique or will they oppose it? This represents a source of worry for teachers.	1
• There is a lack of co-operation between teachers and administration.	3
Time and training	
• The time available to teachers for completing the syllabus is not sufficient for them to adopt co-operative learning.	3
• This approach is time-consuming in terms of lesson planning and preparation.	1

Table 8.9 (cont.)

Expected difficulties	No. of teachers
• Helping both teachers and pupils accustom themselves to these different roles and acquaint themselves with the essential skills for group-work may take a long time, at the expense of the syllabus, particularly since this is a new technique.	3
• Teaching methods such as co-operative learning require appropriate training, which is not available in Qatari schools.	1
Curriculum	
• The syllabus is too full for this new teaching approach to be applied.	3
Policies	
• A new system must be established to accord with this approach. The syllabus, teacher training, school administration, examination, policies and inspectors' responsibilities need to be reconsidered. This requires considerable time and effort on the part of a great many people, at all levels. It also entails intensive study of the cost of each variable and the real return to be gained.	1
Cultural factors	
• Pupils are used to traditional teaching methods; they can cope with them very well. Therefore it will take time to change their habits.	6
• Society does not sufficiently appreciate the importance of group process.	1
• Parents encourage competition rather than co-operation.	1

Table 8.10 Teachers' evaluation of the training programme

Expected difficulties	No. of teachers
Preparation	
• The preparation of the workshop was good, since the participants were informed of the date, time and place of the workshop in advance.	3
• The objectives and procedures of the workshop in general, and the activities in particular, were clear and practical.	2
• Tools and equipment for the activities were appropriate and to hand.	3
• Arrangements were made in advance with the Ministry of Education and school administrators, which helped to release teachers from their duties.	1

Table 8.10 (cont.)

Expected difficulties	No. of teachers
Organisation	
• The workshop kept to a precise timetable.	2
• The overall organisation of the workshop was good.	3
• The presence of an assistant to help the researcher lead the training programme was useful.	1
• The site of the workshop was large, comfortable, fully equipped and well organised.	2
Content	
• The content of the workshop was very logical, leading from existing problems in teaching to the potential alternatives.	3
• The activities were practical and required groupwork to complete them.	3
• The content of the workshop covered both theoretical and practical aspects of co-operative learning, which helped teachers to understand this teaching method appropriately.	1
• The content had to be severely condensed to match the available time.	1
• The activity sheets should contain more information about co-operative learning, so that future participants can use them as a resource.	1
Duration	
• In general, the duration of the workshop was sufficient for learning about co-operative learning.	3
• The duration of the workshop is not sufficient for understanding the concepts, and acquiring the skills, of co-operative learning.	1
Suggestions	
• The number of participants should be increased, so that ideas, experience and information can be exchanged.	1
• More attention should be paid to practical skills such as lesson planning and classroom management.	3
• The number of microteaching lessons should be increased so that teachers master the skills of co-operative learning.	1
• In order for the researcher to gain appropriate feedback, the workshop should be implemented on a larger scale in terms of duration and sample size.	1

Table 8.10 (cont.)

Expected difficulties	No. of teachers
• Officials from the Ministry of Education should attend this type of workshop, so that they can comprehend the objectives and witness the procedures of this teaching method.	2
• Real classrooms should be used to train teachers, rather than a microteaching environment, so that they absorb the procedures of the co-operative learning method.	2
• This programme should be submitted to the Ministry of Education so it can benefit from it in training teachers to employ new teaching methods.	1
• Arabic reference materials should be provided, so all teachers can use and benefit from them.	1
• The duration of the workshop should be increased so as to enable the perfection of every aspect of co-operative learning.	1

8.5 Researcher's reflections on and evaluation of the workshop

It is often the case in the early stages of designing a training programme that one is highly dependent upon reference materials, and upon hunches about the effectiveness the designed activities will have in achieving the desired objectives. However, ideas have to be put into practice before they can be evaluated. Therefore, in the training programme teachers were encouraged to speak their thoughts, criticise and make suggestions at any point. In general, there is evidence that the training programme was successful and achieved most of the desired objectives. However, teachers encountered some problems and difficulties in acquiring the skills to adopt new roles in the classroom. As a result, some measures were taken to ensure that teachers would be capable of implementing co-operative learning in the classroom. For example, they were asked to plan and teach two lessons in their real classrooms before implementing the experimental lessons. In this section I shall attempt to evaluate the workshop in terms of its preparation, organisation, content and duration.

8.5.1 Preparation

In general, the preparation of the workshop proved effective, in that the training programme proceeded smoothly. The only problem encountered in preparing for the workshop was ensuring a reasonable number of children attended the microteaching lessons, because schools were closed at the time of the workshop. Arrangements were made with twelve children; however, only six children were able to attend, because the person responsible for bringing the children was sick at the time. Otherwise, the researcher encountered no serious problems in preparing for the workshop.

8.5.2 Content

Efforts were made to ensure that the content of the workshop followed a logical sequence leading from one idea to another. Although one teacher expressed his concern about the density of the workshop content, most of the teachers were not of the same opinion. During the workshop teachers had time to discuss, summarise and present their findings. The only occasion when it was felt that the workshop was overloaded was on the day of microteaching. Essentially, the problem was that the researcher had seriously underestimated the difficulties in implementing four lessons in one day, especially as the teachers and pupils had no prior experience with co-operative learning. Also, some teachers, especially those who were selected to implement co-operative learning in classrooms, expressed their concern about implementing co-operative learning without a real trial in real classrooms. Those teachers were therefore given the chance to try out co-operative learning on two occasions before the implementation phase of this study. These lessons served three purposes. First, they provided an additional opportunity for the teachers to acquire the

skills involved in co-operative learning. Secondly, they familiarised pupils with the co-operative learning technique. And third, they trained observers to use the observation checklists in a real environment.

8.5.3 Duration

Despite the concern of one teacher that the duration of the workshop was not sufficient for acquiring the skills and an understanding of the concepts involved in co-operative learning, most were satisfied with the length of the workshop. Also, the researcher feared that if the workshop lasted for more than six days the Ministry of Education would hesitate to release teachers from their duties. He also considered that teachers needed to prepare themselves for the new term of schooling, which requires a great deal of time and effort.

8.6 Lessons learned about training

One of the most important lessons to be learned from the training programme is that one should not try to rush an innovation in teaching methods. This is especially true when new ideas or practices are being introduced. It is important to give the learners enough time to think, reflect and make their own use of the new ideas. Secondly, it is important that learners be given the opportunity to make use of their experiences. In the workshop, the teachers responded well to small-group work. When a task was assigned or difficulties arose, teachers pooled their experience, different teachers in the group remembering different things, but all the teachers contributed to complete a task or overcome a problem. Third, the activities should be made as practical as possible. It is important for activities to be structured co-operatively, so that

participants work together to complete tasks. This gives them the chance to share ideas, to improve the standard of their product and to solve problems effectively. Fourth, participants should be encouraged to express their feelings with their fellow group members and to discuss concerns with the instructor whenever they wish.

8.7 Issues emerging from the training programme

This chapter is concerned with the evaluation of the training programme for teachers. Over and above the data previously presented, certain interesting points emerge, which this section will discuss. From the teachers' opinions as presented earlier in this chapter it can be seen that teachers were supportive throughout the programme, maybe because co-operative learning was new to them. As a result they wanted to know whether it could be of any use to them as an alternative teaching method.

Also, it should be said that the Ministry of Education supported this project, and it may be that for this reason the subject teachers were very supportive. In the same way, the researcher's own relationships with participants also contributed to the success of the project, in that a few of the subject teachers were known to him and one of them, in fact, had taught him science at primary school. Interestingly, it seems that some of the teachers agreed to participate in the training programme because they wanted to meet their fellow teachers. This became clear when teachers said that it was good to make the acquaintance of new colleagues.

Another point of interest concerns the way in which the teachers interacted. At the beginning of the training programme they were reserved, and preferred talking to the

researcher rather than to each other. But later, they started exchanging ideas with each other more freely. It can thus be said that the teachers did not know each other in the early stages of the project, which seems to confirm that they had not been getting the opportunity to meet each other to share experiences. There is also the question of why teachers continue to use the traditional teaching method in classrooms. The view of the teachers on this question is very interesting, in that the researcher expected that teachers would say there is no alternative teaching method. But what the teachers said is that the traditional teaching method is the method recommended by the Ministry of Education. They also associate this method with lack of teaching materials, in that it is possible to teach in this way without certain teaching materials.

During the training programme, although the teachers were confident that they had understood the concept of co-operative learning, there was concern among them regarding the application of the co-operative learning method in the 'natural' environment. Teachers outlined some of the reasons for this concern:

- Lack of tools, equipment and other resources hinders the use of new teaching techniques.
- Periods devoted to teaching are not adequate for achieving what is expected of the teacher in class.
- A large proportion of teachers, particularly Qatari teachers, lack interest in the teaching profession.
- Overcrowded classrooms make lecturing the best method for controlling the class.

8.8 Conclusion

As we can see, the above section has raised a number of points of interest and concern in connection with the evaluation of the training programme for co-operative learning. The question which emerges from this is whether we can see the effectiveness of such a training programme in respect of actual implementation of the co-operative learning technique. The next chapter will discuss this point.

Chapter 9

Evaluation of the Teachers' Response to the Experimental Programme

9.1 Introduction

The third stage of this study was concerned with implementing co-operative learning in classrooms. The main objectives of this chapter are to examine the teachers' commitment to co-operative learning, evaluate their effectiveness in using co-operative learning in the classroom, and identify the difficulties they encountered in implementing co-operative learning. Three data collection methods were used to accomplish these objectives, interviews, diaries, and observations. The following section describes the procedures and methods of analysis employed in the data gathering. This chapter also includes the analysis of the data obtained using these techniques.

9.2 Methodology and procedures

Following the training programme, all seven teachers who participated in the workshop were asked whether they would be interested in taking part in the experimental programme. Four teachers said that they were. Of these four, three were Qatari and one non-Qatari. The teachers were all university graduates, and had from four to nineteen years' teaching experience. They teach in three different institutions. All the teachers taught both treatment and control groups except one, who taught only

one group (an experimental group). They conducted two preparatory lessons and four experimental lessons.

The teachers were asked to record the impediments, problems and dilemmas that they encountered during the four experimental lessons using co-operative learning (see Appendix 10). The total number of diary entries expected was 16 (four per teacher). The response of the teachers in writing diaries was very high: the maximum number of entries expected were received.

The four teachers were also interviewed on two occasions, before and after implementing co-operative learning, using structured interviews. The interviews aimed to obtain information about the teachers' existing teaching methods, to examine their commitment to co-operative learning, and to explore the advantages, disadvantages and difficulties they encountered in implementing co-operative learning. All the interviews were tape recorded, except that one teacher preferred to have the questions in advance so as to answer them in writing.

The teachers were also observed throughout the experimental lessons. Observers were given a specially-designed structured checklist to complete at the time of the observation (see Appendix 7). They were also asked to write a report immediately after observing the lesson, using the comments recorded in the observation scheme. The total number of observation checklists and reports expected was 32 (16 checklists and 16 reports). All the 32 observation schemes and reports were received at the end of the experimental lessons.

Miles and Huberman's (1994) interactive model of data analysis and prestructured case analysis, which are described in Chapter 8, were employed to analyse the teachers' diaries, interviews and observations. The results of the analysis of each of these are presented in the sections which follow. These results will then be triangulated to draw out the contrasts, similarities and contradictions inherent in them. Nachmias and Nachmias (1987) point out that all methods of data collection have certain advantages but also some inherent limitations. They write:

> To a certain degree, research findings are affected by the nature of the data collection methods used. Findings that are very strongly affected by the method used could be artefacts rather than objective facts. In order to minimise the risk of erroneous conclusions, a researcher can use two or more methods of data collection to test possible hypotheses and measure variables. (p. 208)

One method of data collection alone cannot adequately provide data which will enable a real understanding of teachers' and pupils' perceptions, practices, skills, behaviours, feelings and reflections. Therefore, more than one method of data collection was used to investigate the variables under study. Such a combination of data-gathering methods is usually called triangulation. Cohen and Manion (1994) state:

> Triangulation may be defined as the use of two or more methods of data collection in the study of some aspect of human behaviour ... By analogy, triangular techniques in the social sciences attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data. (p. 233)

At the third stage of this study, it was felt that using triangulation would increase the credibility of the findings, and help to cross-check the accuracy of the data gathered.

9.3 Results: interviews with teachers before implementation

The pre-implementation interview schedule contained eleven questions, which were both open-ended and closed (see Appendix 5). Although the number of teachers interviewed was small, the researcher would argue from their informal conversation

with him that they adequately represented the views of the majority of primary school science teachers.

As was noted earlier, there is a debate in Qatar over the definition of traditional teaching methods. It was important to find out the teachers' definitions of these. Teachers characterised traditional teaching methods as teacher-oriented; the teacher acts as a sender and the pupil as a receiver of information, and pupil participation is very limited. For example, one teacher said that the traditional teaching method is the method which:

> depends mainly on delivering of information. The teacher talks and gives information, while the pupils' role is receiving ... from my point of view, this is the most prevalent technique as it is the cheapest and the easiest kind of teaching ... All you need is the blackboard and chalk. (SA)

Another teacher remarked:

> I think it's the method followed in teaching nowadays ... This is a teacher-centred method where the teacher delivers information most of the time ... and pupils' participation is very limited ... only when answering questions.
> (NA, 24.9.95, p. 1, ll. 5–9)

The subsequent question was concerned with whether or not teachers regard their existing teaching practice as comprising traditional methods. All the teachers agreed that their teaching method was mainly whole-group instruction, starting with revision of the previous lesson, then moving on to a presentation of the new concepts and the raising of questions related to the lesson, followed by pupil assessment via the exercises in the textbook. It seems that the existing teaching methods of these teachers had, in their estimation, a great deal in common with traditional teaching methods. For example, one teacher asserted:

> Usually, I start the lesson by introducing the new lesson and revising the previous material and linking them together through questions and confirming some of the concepts that may cause some doubt ... then I explain the new concept or those of the lesson using the lecturing technique ... if there is any experiment, I display it to the

> pupils alone. Very rarely, I ask one pupil to help or participate ... this is because of the shortage of sufficient tools and time ... after that I do the assessment by working out the exercises ... at the end of each unit. (SA, 24.9.94, p. 1, ll. 18–23)

With this point in mind the researcher was concerned with whether or not the teachers' existing teaching methods were suitable for teaching the science course. The teachers reported that they encountered great difficulties in teaching the curriculum, difficulties which ranged from the density of the content to a lack of educational aids and the absence of appropriate training. Table 9.1 presents a summary of the difficulties teachers encountered in teaching the curriculum.

The main question that arises here is, were the teachers satisfied with their teaching methods or were they looking for a new teaching method to use in their classrooms to overcome the limitations of their existing practice? Interestingly, three teachers were keen to find a teaching method that might increase pupil participation and achievement. This suggests that teachers have an interest in learning new teaching methods. Only one teacher insisted that his teaching method was suited to the present circumstances in Qatari primary schools. The following comments illustrate both these viewpoints:

> ... I always look for new methods and techniques to increase pupil participation and achievement ... I tried to use different methods of teaching in my classrooms. (MM, 26.9.94, p. 1, ll. 27–8)

> Yes, I always read books of teaching methods so as to find new ideas ... I tried to apply some ideas but I did not succeed ... Unfortunately, I do not have enough time to search in such a field ... because of a heavy teaching burden and many responsibilities. (HA, 26.9.94, p. 1, ll. 22–5)

> ... I think that the method I am using at present is the best technique in the present circumstances ... and it suits the reality of the situation in schools. (SA, 24.9.95, p. 2, ll. 16–18)

Table 9.1 Difficulties teachers reported in teaching the present science curriculum

Theme	Number of teachers
The number of activities recommended by the textbook places a large burden on both teacher and pupils.	3
The course requires pupils' participation in the class, which is very difficult because of the shortage of time and facilities.	1
There is too much repetition of a number of concepts presented in the course.	2
There is a shortage of the educational aids required by such a course.	3
The teacher cannot pay attention to individual differences because of the heavy demands of the course.	1
The course needs the co-operation of the teachers if it is to be well planned and taught. Such co-operation is not always forthcoming, however, which places a burden on the individual teacher.	1
The course demands that the pupils themselves should be an active and effective factor in the learning process, but this cannot be achieved given traditional teaching methods, lack of educational aids and shortage of time.	1
The role played by parents in the teaching process is too limited, especially in science, where help from parents is needed in performing some of the requisite experiments on the course.	1
The teacher requires preparation, or requalification and the development of new skills, to be able to achieve the objectives of the course.	1
The course is highly extensive, and especially so in some stages, such as the fifth primary.	3
There are some difficult concepts involved which do not match the age of the primary-stage pupils, for example the concept of atoms.	2
A great deal of effort and energy is required from the teacher to teach this course well, but the traditional teaching method is no longer suitable for teaching such a course.	1
Because the traditional teaching method depends on the reciting of information, the pupils will soon forget information absorbed in previous years, or even the previous few months. This places a great burden on the teacher, who has to keep on repeating the same concepts.	1

One interesting point to note is that the teachers claimed that the traditional teaching methods are imposed upon them. They agreed that they do not have the freedom to apply the teaching methods they think are suited to their classrooms. They indicated

that educational inspectors and school administrators may interfere in their teaching methods. Moreover, they claimed that they are sometimes forced to make changes to examination questions because the authorities are concerned only with pass rates. Only one teacher considered that, so long as the technique he employs offers the same degree of success as the traditional method, he can use any technique.

The above findings led the researcher to ask the teachers about co-operative learning as a potential alternative to traditional teaching methods. Teachers were asked to discuss the advantages of and difficulties associated with co-operative learning. This question was addressed in the teachers' diaries during the training programme, and is addressed here for purposes of triangulation. Interestingly, teachers seemed to give information similar to that obtained from the teachers' diaries during the training programme. Table 9.2 presents the advantages and difficulties as reported by teachers in their responses to the sixth question. It shows that teachers were, again, concerned about many variables such as lack of tools and equipment and the inadequate design of classrooms and laboratories for groupwork. It shows also that teachers had high expectations regarding co-operative learning. They reported that many advantages can be gained from co-operative learning, including increases in effectiveness, social skills, self-esteem and motivation.

One other interesting point is that, although the teachers expressed some concerns about the implementation of co-operative learning, they suggested many useful strategies for overcoming these difficulties.

Table 9.2 Advantages and disadvantages of co-operative learning

Theme	Number of Teachers
Advantages	
It increases the effectiveness of the pupils in the class.	3
It helps pupils acquire problem-solving and investigation skills.	1
It helps pupils to plan and co-operate to reach their goal.	1
It allows pupils to learn from each other.	1
It enhances pupils' self-esteem.	2
It relieves the burden on teachers of talking all the time in the class.	2
It helps pupils to acquire social skills such as co-operation, listening to others and engaging in discussion.	2
It increases pupils' motivation to learn.	1
It increases pupils' capacity for understanding the concepts being taught.	1
Difficulties	
Lack of tools and equipment hinders groupwork.	4
The design of the curriculum needs modification to suit working in groups.	1
The high achievers might dominate the group.	1
Classrooms and laboratories need to be redesigned to suit groupwork.	3
Co-operative learning requires preparation and advance planning, which means a great deal of effort must be expended.	1
It requires that teachers be trained to grasp the theoretical concepts and acquire the practical skills involved.	1
The culture of society encourages competition in all fields.	2
Over-populated classrooms hinder the appropriate implementation of co-operative learning.	1
There is a shortage of reference materials which teachers may need to employ this technique.	1

The following strategies were mentioned:

1. Gradual application of co-operative learning.
2. Application of co-operative learning at a very early stage.
3. Generation of awareness so that parents would be convinced of the value of this technique and support it.
4. Gradual elimination of the shortage of tools and equipment.
5. Participation of home, schools and pupils in producing educational aids and carrying out programmes.
6. Teachers working as a team to produce educational aids, plan lessons and offer support to colleagues.

Although teachers were aware of some of the difficulties in implementing co-operative learning, they showed a high level of commitment to co-operative learning. All the teachers agreed that teachers in Qatar should be trained to employ co-operative learning in classrooms, especially in science, since this subject calls for a great deal of continuous participation and interaction.

The teachers' commitment became clear when they were asked to discuss potential criticism from their colleagues at school if they tried to apply co-operative learning. Interestingly, only one teacher said that he was affected by criticism from his colleagues, while the other teachers asserted that criticism was always present but did not worry them.

As mentioned earlier, co-operative learning is a teaching method new to the Qatari education system, including to school administrators, parents, teachers and pupils. It was felt important to address the cultural aspects of adopting co-operative learning.

Accordingly, the teachers were asked whether co-operative learning conflicts with the culture of Qatari society. They responded to this question on two levels, the theoretical and the practical. They considered that, theoretically, the method does not clash with the culture of the society, because the culture is originally derived from the religion of Islam, and urges people to be co-operative in all respects. However, the method does conflict with certain economic and social realities which now govern the society, especially the economic reality of people striving to raise their standard of living.

Before implementing the experimental lessons, the researcher was concerned with the readiness of teachers to implement co-operative learning in practice. All the teachers agreed that they were ready to take co-operative learning on board. They stated positively that they were aware of all the elements of co-operative learning, including lesson planning, the roles of pupils and teachers, classroom management and the control and evaluation of pupils.

9.4 Results: teachers' diaries during the implementation phase

Data from the teachers' diaries were retained throughout the implementation of co-operative learning in schools. During the first lesson teachers expressed their feelings in different ways. Some teachers considered that the lesson was relatively successful; others reported some difficulties in teaching the first lesson, including problems with classroom control and role confusion. For example, one teacher said the following:

> The first day was more successful than I had expected. However, the pupils needed more time to understand their roles and follow the written instructions. At first, I was dissatisfied with the level of class control and with the pupils' inter-group interaction. (NA, p. 2, ll. 2–11)

Another teacher said:

> I think that rapport among the pupils was not achieved at the beginning of the lesson since the pupils are not used to working in groups ... and some pupils were passive during the group process ... I tried to encourage them to participate. (SA, p. 1, ll. 11–14)

Another point of interest in the teachers' diaries was that all the teachers seemed to agree that, as time passed, their skills in implementing co-operative learning improved. These included improvements in classroom management and in role simulation. For instance, one teacher evaluated his performance during the first lesson as follows:

> I personally believe that the lesson was below average. I could not adopt the role of teacher to manipulate the groups as I was expected to do. The pupils also did not perform their roles well. (HA, p. 2, ll. 23–6)

Interestingly, the same teacher made this comment on the third lesson:

> My impression of the third lesson is a good one. I have got the feeling that I could perform my roles far better. Even the time factor seemed to be more under my control. (HA, p. 2, ll. 2–3)

The pupils also seemed to be happy experiencing co-operative learning. Three teachers reported that their pupils were enthusiastic about and supportive of the groupwork. Some of the teachers asserted, also, that regardless of the difficulties in implementing co-operative learning they would continue using this technique. One teacher, for example, said the following:

> Although there are a number of difficulties in implementing co-operative learning, I would like to continue to use this technique, because I feel that this method is appropriate for teaching science in primary schools. And from my observation, I noticed that pupils were trying to simulate their roles and work as a team, which indicates that pupils accepted this method and liked it. (MM, p. 2, ll. 4–10)

Another teacher supported this view, asserting that many pupils expressed preferences for groupwork rather than work of the traditional kind.

Teachers also evaluated their experience of applying co-operative learning in practice in terms of the advantages they perceived and the difficulties they faced in applying this technique in the classroom. Table 9.3 presents the advantages teachers and pupils gained from using co-operative learning in classrooms. It shows that all the teachers agreed that the pupils were enthusiastic and enjoyed working in groups. They also reported that teachers involved in co-operative learning have more interesting roles than teachers employing traditional teaching methods.

Table 9.3 Advantages teachers and pupils gained from applying co-operative learning in classrooms

Theme	Number of teachers
Advantages for pupils	
• The pupils' enthusiasm for engaging in co-operative learning was evident throughout the experimental lessons.	4
• The pupils' performance of their roles continually improved.	1
• The majority of the pupils enjoyed working in groups.	1
• The pupils' active participation and effective performance in the co-operative learning class increased.	1
• The personalities of each of the pupils were projected more obviously.	2
• Groupwork increased the pupils' sense of responsibility.	2
Advantages for teachers	
• The teacher's role is more that of an adviser and organiser than of an information provider, as traditionally used to be the case.	2
• The relationship between teacher and pupils has become more intimate and positive, which is not the case with the traditional approaches.	1
• The teachers' performance of their roles improved continually from one lesson to another.	2
• Teachers discovered that their pupils had abilities and skills of which they, the teachers, had not been aware, such as skills in summarising, presenting and managing information.	2
• Implementing such an approach motivates the teacher to think about improving his performance and about problem-solving.	1
A number of the teachers' colleagues showed an interest in this teaching method, which the teachers found supportive.	1

Table 9.4 summarises the difficulties teachers and pupils encountered in teaching the experimental lessons as recorded in the teachers' diaries. It shows that some teachers were concerned about classroom management, the inadequacy of classroom design, and the inability of pupils to read written instructions.

Table 9.4 Difficulties teachers and pupils encountered in teaching the experimental lessons as recorded in the teachers' diaries

Theme	Number of teachers
Difficulties for pupils	
• There was a problem relating to the pupils' misunderstanding of their roles, since there was confusion, particularly on the first day, as to what the various roles implied.	3
• Some pupils were unable to understand and follow written instructions.	2
• The pupils could not move freely from group to resource table and the teacher's desk, because the classroom was over-populated and space limited.	
• Pupils needed more than four lessons to perform their roles perfectly.	1
Difficulties for teachers	
• Some teachers had a problem controlling the pupils, especially during the first and second lessons.	2
• At first, some teachers were unable to estimate the time required by pupils to finish a certain task. If the time is too great there will be disorder in the class. If the time is insufficient the pupils will become worried and frustrated.	1
• The teacher's task in the co-operative learning class is much more difficult than in the traditional class.	1
• Managing, controlling and supervising six groups at the same time is a tiring job. The teacher has to move about the classroom a great deal.	1

9.5 Results: observation of teachers

Data from the observation of teachers were obtained throughout the four experimental lessons. This section identifies the main behaviour patterns and changes in behaviour

evident during the experimental programme and the main themes arising from the observation data. Both unstructured observation (the writing of comments and reports) and structured observation (checklist) techniques were used to gather the data needed (see Appendix 7). After the first lesson observers reported that some teachers were confused and had no control over their classrooms, especially at the beginning of the lesson, while others were able to lead and control the class smoothly. For example, one observer said the following:

> At the beginning of the lesson, the teacher had no control over his class because of the basic factor that the laboratory was not ready to receive the pupils in groups. But in almost three minutes, the teacher started to have control over the class. (AA, 29.11.94, p. 1, ll. 8–10)

Another observer made this comment:

> The teachers and pupils entered the laboratory in an orderly way. The pupils went to the desks on which the name of each group was written ... Then the teacher, orally, informed the pupils of the nature of the lesson, the objectives and the task required ... Then the teacher began to pass among the groups to make sure that they were reading the instructions. (AA, 27.11.94, p. 1, ll. 4–16)

Another pattern that the observers recorded was that the teachers' performance improved from one lesson to another. They reported that lessons three and four were characterised by smooth running on the teachers' part and a high degree of involvement on the part of the pupils. Only one teacher had a recurrent problem in controlling the class throughout the experimental lessons. One observer described the fourth lesson like this:

> The teacher was in control of the class from the beginning of the lesson, and the laboratory was prepared to receive pupils ... The teacher informed the pupils of the academic and social objectives ... then he explained the task for pupils ... then he called the manager of each group and gave him the seed samples, worksheet and tools required ... The teacher was walking through the groups monitoring and providing assistance for the groups ... he was encouraging pupils to discuss together and ask each other when difficulties arose ... then he asked each group to present its findings ... the teacher asked the manager of each group to hand in the worksheet and return the tools. (AA, 3.12.94, p. 1, ll. 1–26)

Another described the fourth lesson, given by another teacher, as follows:

> As usual the teacher was shouting, trying to control the pupils ... It seems that the teacher is not prepared for this lesson ... Although the teacher was walking through the groups, this was not effective in controlling the pupils ... the teacher did not evaluate pupils to make sure that they learned the material. (AG, 3.12.94, p. 1, ll. 1–25)

The structured observation of teachers (checklist) revealed interesting data relating to their behaviour, skills and roles during the experimental lessons. Table 9.5 presents the results of the teacher observation checklists as maintained throughout the experimental lessons. It shows that teachers were able to formulate objectives, promote interdependence and make clear decisions throughout the experimental lessons. All observers agreed that teachers were able to specify academic and social objectives, to assign different roles to pupils, to select a pattern of group formation and to determine the size of the groups. Also, they agreed that teachers were able to structure the task to promote interdependence, explain the task so that pupils were clear about the assignment, specify a group goal, and encourage pupils to work together to achieve the group goal.

It appears that teachers differed regarding their approaches to and their skills in monitoring and intervening in the classroom. Table 9.5 shows that some teachers (e.g. teacher MM and teacher NA) were able to fulfil most of the criteria for good monitoring and intervening, while others (e.g. HA and SA) were struggling and showed inconsistency in fulfilling the criteria. This was also evident from the observers' reports, which recorded the struggle of some teachers to achieve the criteria for good monitoring and intervening. The table also shows that teachers seem to be able to evaluate pupils individually and as groups. Teachers were able to explain the criteria for success, reward groups for a joint product, praise good work and sometimes set individual tests (oral or written).

Table 9.5 Results of the teacher observation checklists throughout the four lessons

Criteria	Scale	Teacher MM				Teacher HA				Teacher NA				Teacher SA			
		L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4
Formulating objectives																	
Does the teacher specify academic objectives?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Does the teacher specify social objectives?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Making decisions																	
Are pupils assigned different roles?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
What is the pattern for group formation?		Ag	Ag	Ag	Ag	Rg	Rg	Rg	Rg	Ag	Ag	Ag	Ag	Ag	Ag	Ag	Ag
What is the size of the group?		5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6
Structuring the task and interdependence																	
Does the teacher plan the task to promote interdependence?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Does the teacher explain the task so that pupils are clear about the assignment?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Is there a group goal?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Does the teacher encourage pupils to work together to achieve the group goal?	Y N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Y = yes; N = no; L = lesson number; Ag = ability grouping; Rg = random grouping.

Table 9.5 (cont.)

Criteria	Scale	Teacher MM				Teacher HA				Teacher NA				Teacher SA			
Monitoring and Intervening																	
Does the teacher provide task assistance by himself?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Does the teacher ask groups to help each other?	Y	✓	✓	✓			✓		✓			✓	✓		✓		
	N				✓	✓		✓		✓	✓			✓		✓	✓
Does the teacher specify desired behaviour?																	
(a) discuss quietly	Y	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
	N							✓									
(b) listen to your groupmate	Y			✓	✓								✓		✓		
	N	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
(c) move quickly and quietly	Y	✓	✓	✓							✓	✓	✓	✓		✓	✓
	N				✓	✓	✓	✓	✓	✓					✓		
(d) do your job	Y	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
	N							✓									✓
(e) accept others' opinions	Y		✓	✓	✓					✓	✓	✓	✓		✓	✓	✓
	N	✓				✓	✓	✓	✓					✓			
(f) share your thoughts	Y	✓	✓	✓							✓	✓	✓			✓	✓
	N				✓	✓	✓	✓	✓	✓				✓	✓		
(g) share your materials	Y	✓	✓	✓		✓	✓		✓		✓	✓	✓				
	N				✓			✓		✓				✓	✓	✓	✓
(h) make sure that everybody has learned the task	Y			✓	✓	✓				✓	✓	✓					
	N	✓	✓				✓	✓	✓				✓	✓	✓	✓	✓

Table 9.5 (cont.)

Criteria	Scale	Teacher MM				Teacher HA				Teacher NA				Teacher SA			
Does the teacher control the classroom:																	
(a) by asking groupmates to monitor each other's behaviour?	Y							✓		✓					✓		
	N	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓	✓
(b) by himself?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
(c) by using group reward and punishment	Y		✓	✓						✓			✓		✓		
	N	✓			✓	✓	✓	✓	✓		✓	✓		✓		✓	✓
Does the teacher use observation checklists?	Y																
	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Does the teacher walk through the groups?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Does the teacher sit with each group?	Y	✓	✓	✓		✓	✓	✓	✓					✓	✓	✓	✓
	N				✓					✓	✓	✓	✓				
Evaluating pupils																	
Does the teacher explain the criteria for success?	Y	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
	N				✓				✓					✓			
Does the teacher set individual tests (oral or written)?	Y			✓			✓				✓	✓	✓			✓	
	N	✓	✓		✓	✓		✓	✓	✓				✓	✓		✓
Does the teacher make sure that all members in a group learned the assigned materials?	Y			✓			✓				✓	✓				✓	✓
	N	✓	✓		✓	✓		✓	✓	✓			✓	✓	✓		
Does the teacher reward groups for their joint work?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Does the teacher praise groupwork?	Y	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓
	N							✓		✓				✓			

9.6 Results: interviews after implementation of co-operative learning

The post-implementation interview schedule contained eleven questions, which were both open-ended and closed (see Appendix 6).

The first main issue in the post-implementation interview was concerned with whether or not teachers were ready to take on board co-operative learning in practice before starting to teach the experimental lessons. All teachers agreed that they were ready to implement co-operative learning in classrooms. They seemed to be aware of all the elements of this technique such as lesson planning, the roles of pupils and teachers, classroom management and the assessment of pupils.

Subsequently, teachers were given the chance to evaluate their experience in implementing co-operative learning in practice. They were encouraged to reflect upon several essential issues connected with co-operative learning methods in classrooms, and to talk, openly and honestly, of their fears and frustrations as well as about any feelings of success that they might have experienced during the experimental lessons. They did, however, report some difficulties which they had encountered during the experimental lessons. Among these difficulties were problems connected with roles, some teachers saying that they could not adopt a teacherly role in order to manipulate the groups as they were meant to do. Another difficulty was classroom control. Some teachers said that they had no control over the class, especially at the beginning of the first lesson. On the other hand, some teachers said that they paid too much attention to classroom control, which affected their performance in other respects. Finally, there

was the problem of time management: some teachers reported that they had problems estimating the appropriate time required for pupils to complete the tasks and activities.

At this stage, the researcher was concerned with the teachers' strategies for overcoming the difficulties they encountered during the experimental lessons. All the teachers agreed that time, support and practice promised solutions for the difficulties they encountered.

Following the realisation that teachers encountered some difficulties in conducting the experimental programme, it was felt important to examine the enthusiasm of teachers and pupils during the implementation of co-operative learning. Some teachers expressed worry at the beginning, because it was a new experience for them and very different from their existing practice, but as time passed they gained more confidence. Others said they were enthusiastic throughout the experimental lessons.

By contrast, *all* the teachers said that their pupils were enthusiastic and supportive throughout the lessons. However, some stressed that there were a small number of passive or disruptive pupils.

In some ways, one of the key elements for successful teaching is the presence of colleagues' support. Teachers perform better when they have the support of their peers. Therefore the researcher was concerned about whether or not teachers faced any criticism from their fellow teachers. Two teachers mentioned that some of their colleagues had claimed that they had tried co-operative learning before, but it had not

worked. One teacher mentioned that there were some teachers who had expressed an interest in learning about this method. The fourth teacher said that his colleagues' attitude towards this method was good.

There is a substantial body of US research which supports co-operative learning, arguing that it is extremely effective and beneficial for pupils of different levels of achievement and types of personality. Therefore it was seen as important to address the advantages that teachers found in using co-operative learning. Teachers reported the following advantages:

1. It improves social skills such as co-operation.
2. It increases pupil participation.
3. It increases pupils' sense of responsibility.
4. It improves pupils' investigative skills.

The researcher's subsequent concern was with whether teachers would continue to use co-operative learning in the future. Only one teacher answered yes, and he was already using the technique in other classrooms. Three teachers said that they would use the method frequently in selected classrooms and with selected topics. Interestingly, all the teachers agreed that teachers in Qatari primary schools should be trained to employ groupwork in their classrooms. This suggests that teachers had a high regard for co-operative learning. This was evident when they were asked the following question: 'Are you aware of any teaching method that would give a better result than co-operative learning?' All the teachers answered no.

Finally, in order to improve the training programme designed by the researcher to train teachers to use co-operative learning in classrooms, teachers were asked to suggest ways of improving the training programme in which they participated. They made the following suggestions:

1. Increase the number of participants.
2. Increase the number of microteaching lessons.
3. Use real classrooms for practising co-operative learning.

9.7 Results: evidence from teachers' questionnaire, interviews, diaries and observations

In order to give depth to the analysis and increase the validity of the data, the results obtained from the teachers questionnaire, the interviews, diaries and observations were triangulated. Table 9.6 identifies a number of themes, which were investigated using different methods (questionnaires, interviews, diaries). It is evident that the results drawn from the teachers questionnaire and from the interviews and diaries show similarities regarding the limitations of existing teaching methods in Qatari primary schools. It seems that these limitations relate to a wide range of factors, such as the participation of pupils, critical thinking, teaching, and the relating of science to real life. It is evident too that the teachers' diaries and interviews with teachers produced similar answers as regards why teachers use traditional teaching methods in classrooms. The table shows that these reasons varied, from lack of tools and density of the syllabus through to weakness in preparation and reasons connected with a shortage of time available to teachers.

Table 9.6 Similarities and contrasts in data obtained from the teachers' questionnaire, interviews, diaries and observations

Theme	Methods of investigation	Similarities	Contrasts
Limitations of existing teaching methods	• Questionnaires • Interviews	• Do not promote participation in the classroom • Do not relate science to real life • Do not promote critical thinking • Fail to use various stimuli • Focus on facts rather than scientific process	*From the questionnaire*: • Do not motivate pupils to learn better • Limit teachers' creativity (For more information see Table 7.5.)
Reasons for using traditional teaching methods	• Diaries • Interviews	• Lack of tools and equipment and other resources hinders the use of new teaching techniques. • The density of the syllabus obliges the teacher to adopt the technique of lecturing in order to complete the syllabus. • Weakness in teacher preparation and training means teachers continue to adopt traditional teaching methods. • The time available for teaching the course is insufficient. • Lecturing is the easiest and fastest method for teaching any subject.	*From the interviews*: • Pupils are used to memorising information. • Overcrowded classrooms make lecturing the best method for controlling the class. (For more information see Table 8.2.)
Benefits of co-operative learning	• Questionnaires • Interviews • Diaries	• Increases pupils' participation in the class • Develops the ability to enquire • Develops social skills • Develops a better relationship among pupils	• The methods each provided different additional items relating to the advantages of co-operative learning. (See Tables 7.7, 8.8, 9.2.)
Difficulties in implementing co-operative learning	• Questionnaires • Interviews • Diaries	• There is a lack of sufficient tools and equipment for groupwork. • Buildings are inappropriate and classrooms are not designed for small-group work. • Some pupils dominate, especially high achievers and older pupils. • More time is required than that available for teaching science. • Society encourages competition. • Classrooms are too densely populated for this teaching method to be used.	• The three data collection methods each provided additional evidence relating to the difficulties involved in implementing co-operative learning in Qatari primary schools. (See Tables 7.8, 7.9, 7.10, 7.11, 8.9, 9.2.)

Another theme which was examined by the three different methods of investigation was the benefits of co-operative learning. The table shows that increased participation, development of social skills, improved ability to enquire and the development of a better relationship among pupils were among the advantages discernible from the various methods of investigation. It seems that most of these items relate to the pupils' affective domain.

Experience of difficulties in implementing co-operative learning was another theme investigated using triangulation. The three methods revealed similarities on several items, including lack of tools, inadequacy of school facilities, time shortages, society's encouragement of competition, over-populated classrooms and domination by some pupils in the groups.

9.8 Issues arising from the implementation of co-operative learning

This section discusses some interesting, and in some cases surprising, findings which emerged from the analysis of the evaluation of the experimental programme. One of these concerns teachers' reasons for using whole-group direct instruction in classrooms. Although teachers are very much aware of the limitations of their task structure, they insist on continuing to use it. There are a number of reasons for this. First, teachers are more familiar with whole-group instruction than with any other method. Secondly, the number of pupils in the class influences teachers' preference for a particular lecturing method. Lack of adequate planning time is another major reason for using whole-group instruction.

Although teachers in Qatari primary schools are facing great difficulties in teaching the new science curriculum, no measures seem to have been taken to overcome these difficulties. There are a number of possible reasons for this. First, the Ministry of Education focuses on the quantitative success of pupils, regardless of qualitative criteria. Lack of adequate financial support may be another major factor. A third reason may be lack of expertise on the part of those responsible for teacher training and in-service programmes.

Another point of interest concerns the freedom of teachers to adopt the teaching methods they think best suited to their pupils. Surprisingly, teachers claimed that they have little freedom to adopt alternative task structures. This might be because of the high degree of centralisation in the Qatari education system. It might also be because teachers usually do not take part in the decision-making and curriculum-planning procedures, which suggests that their role is merely to pass on knowledge. There is evidence from different data sources (the teachers' questionnaire, diaries, interviews) that teachers are concerned about the cultural implications of adopting co-operative learning. They are concerned about the complaints of parents, about pupil resistance and about society being supportive of competition. It should be said that parents do not usually interfere with the school system or with teaching methods. Indeed, teachers often complain about the lack of partnership between school and home. Parents, therefore, do not seem to present an obstacle to the adoption of alternative task structures. Moreover, there is evidence to suggest that pupils are very open to new teaching methods and experiences. Teachers reported that their pupils enjoyed working in groups and were trying to enact their roles and improve their performance

from one lesson to another. Pupils, therefore, should not represent an obstacle to the implementation of co-operative learning.

Another interesting point relates to the advantages of co-operative learning. Some teachers said that they discovered that some of their pupils had abilities and skills of which they had not been aware. This seems to confirm that pupils have not had the opportunity to explore their potential. On the other hand, teachers reported that some pupils had difficulties in understanding and following written instructions. This may be because they are not familiar with this type of activity (following instructions) or it may be that reading difficulties prevent some pupils from reading and comprehending written instructions.

All the teachers agreed that co-operative learning should be used to supplement and enhance whole-group instruction rather than as an alternative to whole-group instruction. This became clear when they said in the post-interviews that they would use co-operative learning frequently with particular topics and in particular classrooms. This seems to suggest that teachers made their own selective use of co-operative learning.

In the interview after the implementation of co-operative learning teachers were asked whether or not they were aware of any teaching methods which would give better results than co-operative learning. Surprisingly, all the teachers said no, which seems to suggest either that teachers have a high regard for co-operative learning or else that they are not up to date with the literature on teaching methods. Another reason might

be the lack of an appropriate in-service programme to keep teachers up to date with new developments in the area of teaching.

9.9 Conclusion

The above sections have raised a number of issues which emerge from the teachers' responses during the implementation of co-operative learning in classrooms. The main question that arises is, can we show that the co-operative learning technique is effective in terms of pupils' performance, perceptions and behaviour? The next chapter will discuss this issue.

Chapter 10

Data on Pupils: Observation, Questionnaires and Achievement Tests

10.1 Introduction

A major aim of this study has been to investigate pupils' perceptions both of existing teaching methods and of co-operative learning. Another aim has been to examine the effects of co-operative learning on pupil achievement. Chapters 7, 8 and 9 have, respectively, presented and analysed teachers' perceptions of existing teaching methods and co-operative learning, evaluated the training programme designed to train teachers to use co-operative learning in classrooms, and evaluated teachers' responses to the experimental programme. This chapter presents the findings from the pupils questionnaires, the observation of pupils and the achievement tests. It also describes the procedures for administering the questionnaires and the achievement tests, the procedures for recording observations, the response rate, and the method of analysis.

10.2 Methodology and procedures

In this study it was not possible randomly to assign subjects to groups. In order to receive permission to incorporate children in the study, the researcher had to agree to use existing classrooms. A sample of 227 sixth-grade male primary school pupils was selected, representing all the pupils in seven classrooms in three different schools in the state of Qatar. These pupils were selected because they were taught science by

teachers who identified themselves as interested in implementing co-operative learning in classrooms. The seven classrooms were divided into two groups, four forming the treatment group and three the control group. The reason the two groups were unequal was that one of the four teachers who implemented the experimental programme had only one sixth-grade classroom, and this was considered as part of the treatment group. Both groups were pre- and post-tested for science performance. The treatment group was taught via the new techniques (co-operative learning lessons), while the control group was taught the same lessons using the traditional approach (mainly whole-group instruction using lecturing and question-and-answer discussion). Post-test science performance scores were compared to determine the effectiveness of the co-operative learning.

The pupils in the treatment group were observed throughout the experimental lessons. One group in each of the treatment classrooms was randomly selected and was observed throughout the experimental programme. The purpose of the observation was to gather information relating to pupils' behaviour and to interactions in the groups. Observers were given a specially-designed structured checklist to complete at the time of the observation (see Appendix 8). Also, observers were asked to write a report immediately after observing the lesson, using the comments recorded in the observation scheme. The total number of checklists and reports expected was 32 (16 checklists and 16 reports). All the 32 observation schemes and reports were received at the end of the experimental lessons.

A pupils questionnaire was administered, in order to investigate pupils' perceptions of co-operative learning. This questionnaire was administered only to the treatment group, because it was concerned with pupils' experience of co-operative learning in the classroom. The pupils questionnaire was administered on two occasions, before and after the experience of co-operative learning. It included 35 items, listed on five pages (see Appendix 3). Since pupils had to answer both questionnaires in the classroom in the presence of the researcher, the response rate was very high: 118 copies were returned, representing 95.9 per cent of the sample. Five subjects were dismissed from the sample, three of them were absent throughout the experimental programme, and two did not complete both questionnaires (pre- and post-). The presence of the researcher helped provide answers to queries and to explain the items in the questionnaires to pupils, so that these were clearly understood.

In this study, the achievement test was used as a baseline test to measure the extent to which pupils had already achieved the objectives of the planned instruction. It was also used as a summative test to measure the pupils' mastery of the instructional objectives at the end of the experimental lessons. The subjects for the achievement test were 227 sixth-grade pupils (123 in the treatment group and 104 in the control group), registered in seven classes in three primary schools. However, 210 pupils completed the pre- and post-tests (118 from the treatment group and 92 from the control group). Class size in both groups (treatment and control) ranged from 25 to 34 pupils.

Some questions in the post-questionnaire referred to the experimental sessions and others to the children's ordinary classes. The researcher drew attention to these as the children worked through the questionnaires.

The achievement test was administered to both treatment and control groups on two occasions, before and after the experimental lessons. The researcher tried throughout to create an atmosphere of confidence and interest in the tests so that pupils could work under good conditions. The content of the lessons to be taught and the objectives to be achieved by the end of the lessons were specified prior to the designing of the achievement test (see Appendix 14).

After data entry, SPSS was used to produce descriptive and inferential statistics (Norusis, 1992). Principal components analysis was used to investigate the factorial structure underlying the pupils' perceptions of existing teaching methods and co-operative learning. The t-test was also employed to examine the difference between the mean rating of pupils' responses to the same variables before and after experiencing co-operative learning. It was also used to test the difference between the mean rating of the factors based on pre-test responses and the difference between the treatment and the control groups in terms of achievement. By contrast, an interactive model of data analysis (Miles and Huberman, 1994) was applied to analyse the data from the observation of pupils. For a description of the model see Chapter 8.

10.3 Results: observation of pupils

Data from the observation of pupils were obtained throughout the experimental programme. This section identifies the main behaviour patterns and changes in behaviour recorded during the experimental lessons and the main issues arising from the observation data. Both structured observation (checklist) and unstructured observation methods (writing of comments, reports) were used to gather the data needed (see Appendix 8). After the first lesson, observers reported that some pupils in the groups had tried to perform their roles and succeeded, while others could not perform them. Interestingly, they noted that roles such as manager, recorder, writer and communicator were performed well, while roles such as encourager and checker were not. For example, one observer reported the following:

> Some pupils tried to perform their roles and they succeeded – like the manager, the recorder, the communicator and the reader – while the encourager and the checker could not perform their roles well. They tried to perform their roles only when the teacher visited the group to remind them of the roles.

Another observer made this comment on the pupils' enacting of their roles:

> The manager, the reader, the recorder and the communicator largely succeeded in performing their roles. The checker's and the encourager's roles were not clear.

Another pattern of behaviour observers recorded was pupil performance improving from one lesson to another. They reported that lessons three and four were characterised by a high degree of involvement and enthusiasm on the part of pupils. One observer described the fourth lesson as follows:

> After the reader had the sheet of instructions, the discussion started ... they divided the task among themselves ... then they discussed the task together and answered the questions ... the recorder's role was very clear – he was in charge of summarising the answers agreed upon and writing them down ... Verbal participation was clear from all members of the group except the encourager, whose participation was limited. The group was working with clear enthusiasm throughout the lesson ... however, the pupil who was performing the manager's role tried to control the group, and he succeeded for 15 minutes, but the teacher intervened and encouraged all pupils to perform their roles. (IS, 3.12.94, pp. 1–2)

All the observers agreed that pupils had difficulty respecting each other's opinions, and that this difficulty continued throughout the lessons. For example, one observer stated:

> It seems clear from the nature of the discussion that the pupils did not have much respect for each other's points of view. Some pupils made fun of others' opinions and accused others of ignorance. (AA, 29.11.94, p. 2)

Some observers reported that a number of pupils had difficulties in reading and following the written instructions, which caused some problems in the groups, such as pupils making fun of the reader or taking over his role. In addition, some observers suggested that the laboratories were not suitable for groupwork, and that pupils could not move freely from group to resource table and the teacher's desk.

The structured observation of pupils provided interesting data relating to their behaviour, aptitudes and roles during the experimental programme. Table 10.1 presents the results of the pupil observation checklist as maintained throughout the experimental lessons. It shows that pupils were able to enact certain roles, such as manager, reader, communicator and recorder, from the first lesson or throughout the experimental programme. However, they had difficulty performing other roles, such as those of encourager and checker. The table also shows that most pupils were contributing verbally in the groups and helped each other to complete the assigned tasks. It is evident too from the table that pupils had great difficulty listening to each other carefully and discussing and encouraging each other's ideas, whereas they had no difficulty writing in groups and sharing materials. It seems that some groups could not understand that group members are responsible for helping each other to master the tasks. Table 10.1 shows that most groups failed to make sure that everyone in the

group had learned the assigned material, and that the pupils in them failed to seek help from each other when a problem or difficulty arose.

It is clear from Table 10.1 that pupils controlling groups, and reluctant pupils, were factors present throughout the experimental programme. It is also evident that pupils were exhibiting some off-task behaviours, mainly non-task talking, daydreaming, wandering around, and attempting to gain attention. Nevertheless, Table 10.1 further shows that in spite of these problems an enthusiasm for completing the assigned tasks was a common feature among the members of the groups.

Table 10.1 Results of the pupil observation checklists kept throughout the experimental lessons

Criteria	Class	Group 1 (MM)				Group 2 (HA)				Group 3 (NA)				Group 4 (SA)			
		L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4
Pupils' roles in group																	
Are pupils assigned different roles?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Is everybody doing his job?																	
Manager	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Recorder	Y	✓	✓	✓	✓		✓	✓		✓		✓	✓		✓	✓	✓
	N					✓			✓		✓			✓			
Encourager	Y	✓	✓	✓			✓	✓		✓	✓	✓	✓				✓
	N				✓	✓			✓					✓	✓	✓	
Communicator	Y	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	N								✓	✓							
Checker	Y										✓	✓	✓		✓		✓
	N			✓		✓				✓				✓		✓	
Reader	Y	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N		✓														
Is everyone in the group contributing verbally?																	
Manager	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Recorder	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Encourager	Y	✓	✓	✓		✓	✓	✓		✓	✓	✓					✓
	N				✓				✓				✓	✓	✓	✓	

Note: Y = yes; N = no; L = lesson number.

Table 10.1 (cont.)

Criteria	Class	Group 1 (MM)				Group 2 (HA)				Group 3 (NA)				Group 4 (SA)			
		L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4
Communicator	Y	✓	✓	✓	✓		✓	✓			✓	✓	✓		✓	✓	
	N					✓			✓	✓				✓			✓
Checker	Y	✓	✓		✓		✓	✓	✓		✓	✓	✓		✓		
	N			✓		✓				✓				✓		✓	✓
Reader	Y	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N		✓														
Discussion																	
Do pupils encourage others' ideas?	Y			✓	✓			✓				✓	✓		✓		
	N	✓	✓			✓	✓		✓	✓	✓			✓		✓	✓
Do pupils discuss others' ideas?	Y	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓		✓
	N								✓					✓		✓	
Do pupils listen to each other carefully?	Y		✓	✓	✓			✓				✓					
	N	✓				✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Do pupils respect each other's opinions?	Y		✓	✓	✓		✓	✓	✓		✓	✓	✓			✓	✓
	N	✓				✓				✓				✓	✓		
Co-operation and interdependence																	
Do pupils share materials?	Y		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	N	✓											✓				
Do pupils write jointly?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	N																
Do pupils help each other to finish the assigned materials?	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
	N													✓			✓
Do pupils make sure that everyone in the group has learned the assigned materials?	Y		✓		✓	✓							✓				
	N	✓		✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Do pupils ask each other when they do not understand something?	Y		✓		✓	✓	✓	✓		✓	✓		✓			✓	
	N	✓		✓					✓			✓		✓	✓		✓

Table 10.1 (cont.)

Criteria	Class	Group 1 (MM)				Group 2 (HA)				Group 3 (NA)				Group 4 (SA)			
		L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4
Pupils' behaviour																	
Are there any particular pupils controlling the group?	Y	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
	N			✓			✓	✓									
Are there any reluctant pupils?	Y	✓		✓	✓				✓	✓		✓	✓	✓	✓	✓	✓
	N		✓			✓	✓	✓			✓						
Are pupils engaging in off-task behaviours?																	
Non-task talking	Y	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
	N		✓		✓						✓						
Daydreaming	Y		✓	✓					✓	✓	✓	✓		✓	✓	✓	✓
	N	✓			✓	✓	✓	✓									
Wandering around	Y	✓	✓		✓	✓			✓			✓	✓	✓		✓	✓
	N			✓			✓	✓		✓	✓				✓		
Working at other tasks	Y			✓		✓			✓								
	N	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Physically disturbing other pupils	Y	✓															✓
	N		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Attempting to gain attention	Y	✓			✓	✓	✓	✓		✓						✓	✓
	N		✓	✓					✓		✓	✓	✓	✓	✓		
Do pupils monitor each other's behaviour?	Y											✓	✓				
	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
Do pupils complain about working with each other?	Y		✓								✓	✓				✓	✓
	N	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓		
Are pupils working enthusiastically in the group?	Y	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	
	N								✓					✓			✓

10.4 Results: pupils' questionnaires

The aim of the pupils questionnaires was to investigate pupils' perceptions of existing teaching methods and co-operative learning. As was indicated in Chapter 6, these questionnaires were administered to the treatment group only. Table 10.2 provides a comparison between pupil responses for all the items on the pre- and post-questionnaires. The t-test was employed to examine the difference between the mean ratings of pupils' responses to the same questions before and after experiencing co-operative learning. It shows some differences in pupils' responses to the pre- and post-questionnaires, including questions related to existing teaching methods, competitive learning and co-operative learning. It also shows that, after experiencing co-operative learning, pupils said that they had enjoyed and benefited from working with other pupils in small groups, and indeed had enjoyed this more than existing teaching methods. The benefits for the pupils included having a better opportunity to understand science, speaking their thoughts, taking an active part in the learning process, decreasing their commitment to competition, and increasing their positive interdependence in the classroom (including sharing ideas and responsibilities).

Table 10.2 Comparison between pupil responses for all items on the pre- and post-questionnaires

Number	Item	Mean pre-test	Mean post-test	T-value	d.f.	significance level
1	The way we learn science is boring	1.74	1.49	1.98	117	$p<0.05$
2	My teacher uses most of the lesson time talking, explaining and instructing	2.95	2.47	3.38	117	$p<.001$
3	The way we are being taught science does not help us understand science	2.18	1.82	2.53	117	$p<0.01$

Table 10.2 (cont.)

Number	Item	Mean pre-test	Mean post-test	T-value	d.f.	significance level
4	My teacher presents outside resources in addition to the textbook	2.82	3.09	-1.81	117	NS
5	I find it hard to speak my thoughts clearly in class	2.50	1.90	4.44	117	p<0.001
6	My science teacher asks us to memorise facts in science	3.06	2.38	4.27	117	p<0.001
7	When I do not understand something in science I ask other pupils to help me understand	2.50	3.27	-5.61	117	p<0.001
8	If I worked with other pupils in small groups I would have the chance to speak my thoughts	3.28	3.35	-.60	117	NS
9	If I worked with other pupils in small groups, it would help me accept other's opinions easily	3.12	3.14	-.12	117	NS
10	If I worked with other pupils in small groups, I would feel that I was responsible for helping other pupils to learn	3.28	3.38	-.81	117	NS
11	If I worked with other pupils in small groups, I would enjoy listening to other pupils' opinions	3.19	3.38	-1.77	117	NS
12	I would like to carry out scientific experiments with other pupils in small groups	3.56	3.55	.16	117	NS
13	If I worked with other pupils in small groups, I would want to share ideas and materials with other pupils	3.49	3.53	-.46	117	NS
14	If I worked with other pupils in small groups, there would be pupils in the group to help me learn	3.29	3.35	-.51	117	NS
15	If I worked with other pupils in small groups, I would want to help other pupils to learn	3.62	3.50	1.50	117	NS
16	If I worked with other pupils in small groups, I would make sure that everyone in the group learnt the assigned materials	3.27	3.27	.00	117	NS

Table 10.2 (cont.)

Number	Item	Mean pre-test	Mean post-test	T-value	d.f.	significance level
17	If I worked with other pupils in small groups, I would learn new things from discussing the assigned materials with other pupils	3.47	3.32	1.19	117	NS
18	In our class our grade depends on how much all pupils learn	1.70	3.09	-8.56	117	p<.001
19	In our class the teachers divide up the material so that everyone plays a part and everyone has to share his ideas	2.09	3.27	-7.63	117	p<.001
20	In class everyone's ideas are needed if we are going to be successful	2.27	3.33	-6.87	117	p<.001
21	Working with other pupils in small groups is better than working alone	3.48	3.52	-.49	117	NS
22	In our class we do not talk to other pupils when we work	3.11	2.05	6.37	117	p<.001
23	If I worked with other pupils in small groups, I would feel anxious when I debated with other pupils	2.33	1.90	2.54	117	p<.01
24	I like the challenge of seeing who is best in the class at science	3.44	3.48	-.31	117	NS
25	I work to get better grades than other pupils	3.45	3.45	.00	117	NS
26	I do better work when I work alone	1.92	1.64	2.17	117	p<.05
27	Working with other pupils in small groups does not help me understand science	1.90	3.22	-7.76	117	p<.001
28	If I worked with other pupils in small groups, there would be some pupils who would try to control the group	2.14	2.00	.87	117	NS
29	If I worked with other pupils in small groups, I would waste my time helping other pupils	1.84	1.72	.82	117	NS

Table 10.2 (cont.)

Number	Item	Mean pre-test	Mean post-test	T-value	d.f.	significance level
30	I feel bad when I get lower scores than other pupils in the class	3.06	3.11	-.39	117	NS
31	My parents encourage me to get the highest scores in the class	3.81	3.74	1.47	117	NS
32	My parents usually compare my scores with other pupils' scores	2.87	2.90	-.29	117	NS
33	I like to know that my performance is better than others' in the class	3.16	3.18	-.17	117	NS
34	I do not like discussion in class	1.55	1.66	-.90	117	NS
35	I do not like other pupils to get scores higher than mine	2.85	2.13	5.82	117	p<.001

In order to investigate the factorial structure underlying pupils' perceptions of existing teaching methods and co-operative learning before the experimental lessons, principal components analysis, with varimax rotation, was employed on the complete sample of 118 primary school pupils. The intercorrelation matrix for all 35 pupils' questionnaire items served as the starting point for this analysis, yielding a twelve-factor solution. All factor loadings were greater than 0.5, no variable appeared in more than one factor, and the eigenvalue was greater than unity. To avoid over-extraction and since beyond seven-factor solutions each of the succeeding factors accounted for less than 4.7 per cent of the total variance, each of the varimax-rotated factor solutions from two to seven was examined to obtain the most simple structure and the most interpretable factor solution. It was found that the varimax-rotated five-factor solution was the most interpretable. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.65, while the Bartlett test of sphericity was 1243.5311 (P<.001), indicating that the variables were suitable for principal components analysis. They

explain 41.0 per cent of the total variance. De Vries (1991) suggested that we can increase explained variance by eliminating odd variables whose variance is not accounted for by the main factors. As a result, all items whose variance was not accounted for by the major factors were dropped. Twenty variables remained, and these were subjected to principal components analysis with varimax rotation. The five-factor solution obtained from this reduced item pool explained 55.6 per cent of the total variance. The KMO was 0.70 and the Bartlett test of sphericity 605.53753 ($P<.001$). The varimax-rotated five-factor solutions are presented in Table 10.3, which shows the loading, communality and mean rating of each item. Factor 1 (commitment to co-operative learning) accounted for 21.8 per cent of the variance and items in this factor related to the willingness of pupils to listen to other pupils' opinions, share ideas and materials and help other pupils to learn. The factor also included items suggesting that co-operative learning would give pupils the opportunity to speak their thoughts and learn new things from the discussion with other pupils. It seems that this is a general factor covering a wide range of behaviours and attitudes, such as sharing ideas and materials, helping others and expressing oneself. Table 10.3 shows that pupils had a high degree of commitment to co-operative learning. As can be seen, all items in the table had a mean value of over 3.1. Pupils seem to be willing to respond positively to co-operative learning.

Factor 2 (positive interdependence) accounted for 10.6 per cent of the total variance and included variables concerned with the importance of everyone's ideas for achieving mutual success, taking an active part in the learning process, and rewarding interdependence. It is evident that all variables in this factor are highly loaded and are

concerned with positive interdependence. All items in factor 2 are given low means, which suggests that existing teaching practices in classrooms do not encourage mutual gain, whereby all the members of the class benefit from the presence of the others, or mutual responsibility where all class members benefit or lose on the basis of the overall achievement of the class. Also, the table suggests that teachers do not actively engage pupils in the learning process.

Factor 3 accounts for 8.7 per cent of the total variance; items in this factor show commitment to competition, including performing better than others in the class, and preferring to work alone. This factor shows that the highest mean is given to the item related to the desire of pupils to outperform their classmates. It also shows that pupils do not like to work alone; the item related to this point is given a low mean.

Factor 4 is described as 'limitations of existing teaching methods'. This factor accounted for 8.1 per cent of the total variance, and items in this factor suggested that the way in which pupils are taught science is boring, does not help them to understand science, and does not promote participation in class. However, all items in Factor 4 are given low means, which suggests that pupils do not consider that existing teaching methods are boring or do not help them understand science. Also, they do not find it hard to express their thoughts clearly in class.

Factor 5 (6.5 per cent of the variance) contains items with high loadings, representing domination in the classroom by teachers; this includes their not offering pupils the chance to communicate with other pupils in the class, and their using up most of the

lesson time talking and instructing. The mean rating of these items suggests that teachers spend most of the lesson time instructing, while pupils have only limited opportunities for communicating with each other.

Table 10.3 Factors derived from the pupils' questionnaire

Number	Variable	Loading	Communality	Mean
Factor 1: Commitment to co-operative learning				
11	If I worked with other pupils in small groups I would enjoy listening to other pupils' opinions.	.78679	.64480	3.19
13	If I worked with other pupils in small groups I would want to share ideas and materials with other pupils.	.76169	.68442	3.49
8	If I worked with other pupils in small groups I would have the chance to speak my thoughts.	.70246	.52425	3.13
17	If I worked with other pupils in small groups I would learn new things from discussing the assigned materials with other pupils.	.64820	.57244	3.47
14	If I worked with other pupils in small groups there would be pupils in the group to help me learn.	.59526	.43810	3.30
12	I would like to carry out scientific experiments with other pupils.	.56860	.44754	3.57
16	If I worked with other pupils in groups I would make sure that everyone in the group learnt the assigned task.	.54551	.52369	3.27
Factor 2: Positive interdependence				
20	In class, everyone's ideas are needed if we are going to be successful.	.83659	.6219	2.27
18	In our class our grades depend on how much all pupils learn.	.81335	.56237	2.09
19	In our class the teacher divides up the materials so that everyone plays a part and everyone has to share his ideas.	.77124	.69392	1.70
Factor 3: Commitment to competition				
33	I like to know that my performance is better than others' in the class.	.67219	.61896	3.17
26	I do better work when I work alone.	.60171	.46785	1.92
Factor 4: Limitations of existing teaching methods				
1	The way we learn science is boring.	.75808	.59690	2.19
3	The way we are being taught does not help us understand science.	.76641	.63676	1.75
5	I find it hard to speak my thoughts clearly in class.	.63259	.45670	2.50
Factor 5: Domination of the class by the teacher				
22	In our class we do not talk to other pupils when we work.	.65058	.61411	2.96
2	My teacher uses most of the lesson time talking, explaining and instructing.	.79114	.67430	2.34

Principal components analysis was employed on the post-questionnaire to examine whether or not the factorial structure of the post-questionnaire was similar to that of the pre-questionnaire. It was found that the factorial structure (five-factor solutions) was similar, with minor changes in some items. Therefore the five-factor solution was used as a set of sub-scales to investigate the probabilities of changes between pre- and post-test. Table 10.4 presents the result of the t-test. As can be seen, there is a significant difference between Factor 2 before and after the implementation for positive interdependence in the classroom, which suggests that co-operative learning promotes positive interdependence in the classroom, including helping pupils to take an active part in the learning process and sharing ideas to complete the task. Another significant difference which appears in the table is that the mean rating of Factor 4 before implementation of co-operative learning is significantly higher than the mean rating for the same factor after implementation. This reflects the fact that pupils' views about the limitations of existing teaching methods showed inconsistency between the pre- and post-questionnaires. The third significant difference evident from the table is related to Factor 5. The mean rating of the factor before implementation of the experimental programme is significantly higher than the mean rating for the same factor afterwards. This suggests that pupils in co-operative learning lessons had a better chance of expressing their ideas, and that the teacher consumed less time talking, explaining and instructing.

Table 10.4 Factors based on pre-test responses

Factor number	Mean pre-test	Mean post-test	Probability value	Significance level
1	3.34	3.42	.688	NS
2	2.02	3.24	.000	$p<.05$
3	2.54	2.41	.148	NS
4	2.15	1.73	.000	$p<.05$
5	2.65	2.26	.000	$p<.05$

10.5 Results: the achievement tests

The achievement test was administered to both the treatment and the control groups on two occasions, before and after the experimental lessons. All pupils were put into three categories based on their performance level on the pre-tests. The three categories were: high achievers, average achievers, and low achievers. The overall mean and standard deviation of all pupils (N = 210) on the pre-test were used to categorise pupils. The pupils who scored one standard deviation above the mean were considered high achievers, pupils who scored within one standard deviation of the mean were considered average achievers and pupils who scored one standard deviation below the mean were considered low achievers.

The t-test was employed to examine the differences between the overall mean rating of the treatment group against the control group on both the pre- and post-tests. Table 10.5 shows that there were significant differences between the treatment and the control groups in their performance on the pre-test, with a statistically significant difference in favour of the control group. By contrast, the performance of the treatment group was superior on the post-test.

Table 10.5 Comparison of the treatment and control groups on the science achievement test before and after the experimental programme

Achievement test		Treatment (N = 118)	Control (N = 92)	Probability value	Significance level
Pre-	Mean	5.91	7.06	.007	p<.01
	Standard deviation	3.02	2.99		
Post-	Mean	14.76	12.08	.001	p<.001
	Standard deviation	4.57	4.34		

Table 10.6 compares three attainment levels for the treatment group with the same three attainment levels for the control group by performance on the pre- and post-tests. It shows that the treatment and control groups differed across the three attainment levels in both the pre- and post-tests. Although the difference between the mean rating of the high and low achievers in the treatment and control group was not significant on the pre-test, it became significant on the post-test.

Table 10.6 Comparison of the treatment and control groups by performance level on the pre- and post-tests

Test	Performance	Treatment group (mean improvement)	Control group (mean improvement)	T-value	d.f.	Significance level
	High	11.7	11.2	0.81	35	NS
Pre-	Average	6.0	6.5	-2.06	132	p<.05
	Low	2.4	2.7	-0.70	38	NS
	High	19.2	15.5	2.96	35	p<0.01
Post-	Average	15.0	11.4	4.83	132	p<0.00
	Low	11.8	8.9	2.63	38	p<0.05

Table 10.7 compares the improvement from pre-test to post-test for each attainment group. The improvement was calculated by subtracting the post-test score from the pre-test score for each individual in both the treatment and the control groups. The table shows that the treatment group made a significantly greater improvement across all three pre-test attainment levels than the control group (p<.05 in each case).

Table 10.7 Comparison of improvement from pre-test to post-test for each attainment group

Performance	Treatment group (mean rating)	Control group (mean rating)	T-value	d.f.	Significance level
High	7.5	4.3	3.08	35	p<.001
Average	8.9	4.8	5.79	132	p<.001
Low	9.4	6.2	2.77	38	p<.01

Note: D = post-test score - pre-test score.

The improvement from pre-test to post-test of the high, average and low achievers within the treatment and control groups was compared with a one-way analysis of variance. Table 10.8 shows that there was no significant difference in the achievement level among the three ability categories (high, average, low), either in the treatment or in the control groups.

Table 10.8 Differences between attainment groups in improvement from pre-test to post-test: comparison within treatment and control groups

Group	Performance level			Analysis of variance	Significance level
	High	*Average*	*Low*		
Treatment	7.5	8.9	9.4	.31	NS
Control	4.3	4.8	6.2	.35	NS

Note: D = post-test score - pre-test score.

Table 10.9 provides a comparison between the treatment group pupils' responses on the pre- and post-questionnaire by performance level. It shows that the responses of each ability group to the pre- and post-questionnaire were similar, with limited differences. The high achievers showed that they enjoyed the co-operative learning method; they benefited from working with other pupils in small groups, in terms of understanding science, taking an active part in the learning process, and expressing ideas clearly. Further, they showed less concern that the teacher used most of the lesson time talking, explaining or instructing.

Table 10.9 Comparison of pupils' responses on the pre- and post-questionnaires by performance level (t-test)

Number	Item	High achievers				Average achievers				Low achievers			
		Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level
1	The way we learn science is boring	1.92	1.00	2.52	p<.05	1.76	1.56	1.19	NS	1.62	1.48	.50	NS
2	My teacher uses most of the lesson time talking, explaining and instructing	3.69	2.92	2.54	p<.05	3.06	2.43	3.32	p<.001	2.34	2.34	.00	NS
3	The way we are being taught science does not help us understand science	1.69	1.23	1.31	NS	2.30	1.97	1.85	NS	2.10	1.69	1.28	NS
4	My teacher presents outside resources in addition to the textbook	3.46	3.69	-.54	NS	2.84	3.03	-1.01	NS	2.48	2.96	-1.73	NS
5	I find it hard to speak my thoughts clearly in class	1.61	1.30	1.08	NS	2.65	1.94	4.22	p<.001	2.48	2.07	1.42	NS
6	My science teacher asks us to memorise facts in science	3.23	2.61	1.43	NS	3.17	2.40	3.89	p<.001	2.72	2.24	1.40	NS
7	When I do not understand something in science I ask other pupils to help me understand	2.23	3.15	-2.98	p<.01	2.55	3.28	-4.14	p<.001	2.48	3.31	-2.82	p<.001
8	If I worked with other pupils in small groups I would have the chance to speak my thoughts	3.76	3.92	-.81	NS	3.31	3.31	.00	NS	3.00	3.20	-.76	NS
9	If I worked with other pupils in small groups, it would help me accept others' opinions easily	2.92	3.23	-.84	NS	3.26	3.15	.57	NS	2.86	3.06	-.90	NS
10	If I worked with other pupils in small groups, I would feel that I was responsible for helping other pupils to learn	3.61	3.69	-.32	NS	3.27	3.30	-.19	NS	3.17	3.44	-1.03	NS
11	If I worked with other pupils in small groups, I would enjoy listening to other pupils' opinions	3.61	3.61	.00	NS	3.21	3.40	-1.33	NS	2.96	3.24	-1.35	NS

Note: The degree of freedom for the high achievers was 12, for the average achievers 75, and for the low achievers 28.

Table 10.9 (cont.)

Number	Item	High achievers				Average achievers				Low achievers			
		Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level
12	I would like to carry out scientific experiments with other pupils in small groups	3.76	3.76	.00	NS	3.63	3.53	.69	NS	3.31	3.48	-.78	NS
13	If I worked with other pupils in small groups, I would want to share ideas and materials with other pupils	3.92	4.00	-1.00	NS	3.50	3.50	.00	NS	3.27	3.41	-.72	NS
14	If I worked with other pupils in small groups, there would be pupils in the group to help me learn	3.38	3.38	.00	NS	3.36	3.30	.44	NS	3.07	3.48	-1.68	NS
15	If I worked with other pupils in small groups, I would want to help other pupils to learn	3.61	3.69	-.43	NS	3.64	3.44	1.96	p<.05	3.59	3.55	.17	NS
16	If I worked with other pupils in small groups, I would make sure that everyone in the group learnt the assigned materials	3.46	3.07	1.44	NS	3.22	3.17	.40	NS	3.31	3.62	-1.51	NS
17	If I worked with other pupils in small groups, I would learn new things from discussing the assigned materials with other pupils	3.92	3.53	1.59	NS	3.50	3.26	1.51	NS	3.20	3.37	-.57	NS
18	In our class our grade depends on how much all pupils learn	2.07	3.61	-3.83	p<.001	1.69	3.02	-6.41	p<.001	1.55	3.03	-4.38	p<.001
19	In our class the teachers divide up the material so that everyone plays a part and everyone has to share his ideas	3.15	3.84	-1.81	NS	2.11	3.27	-5.87	p<.001	1.55	3.03	-4.63	p<.001
20	In class everyone's ideas are needed if we are going to be successful	3.23	3.92	-2.11	p<.05	2.22	3.34	-5.94	p<.001	1.96	3.06	-2.96	p<.001
21	Working with other pupils in small groups is better than working alone	3.61	3.84	-.90	NS	3.39	3.51	-.82	NS	3.65	3.41	1.37	NS

Table 10.9 (cont.)

Number	Item	High achievers				Average achievers				Low achievers			
		Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level
22	In our class we do not talk to other pupils when we work	3.46	1.53	3.85	p<.001	3.11	2.19	4.53	p<.001	2.96	1.89	3.02	p<.001
23	If I worked with other pupils in small groups, I would feel anxious when I debated with other pupils	2.46	2.15	.63	NS	2.40	1.84	2.74	p<.001	2.10	1.96	.36	NS
24	I like the challenge of seeing who is best in the class at science	3.46	3.15	1.17	NS	3.44	3.48	-.31	NS	3.48	3.51	-.21	NS
25	I work to get better grades than other pupils	3.46	3.46	.00	NS	3.72	3.27	2.93	p<.001	3.58	3.55	.14	NS
26	I do better work when I work alone	1.61	1.30	1.00	NS	1.98	1.68	1.83	NS	1.89	1.68	.77	NS
27	Working with other pupils in small groups does not help me understand science	1.30	3.76	-7.88	p<.001	2.06	3.11	-4.68	p<.001	1.75	3.24	-5.08	p<.001
28	If I worked with other pupils in small groups, there would be some pupils who would try to control the group	2.15	1.92	.58	NS	2.14	2.06	.41	NS	2.13	1.89	.68	NS
29	If I worked with other pupils in small groups, I would waste my time helping other pupils	1.30	1.23	.29	NS	1.85	1.80	.30	NS	2.07	1.75	.85	NS
30	I feel bad when I get lower scores than other pupils in the class	3.23	2.84	1.44	NS	2.98	3.10	-.72	NS	3.20	3.27	-.25	NS
31	My parents encourage me to get the highest scores in the class	3.76	3.69	1.00	NS	3.82	3.77	.81	NS	3.79	3.69	1.36	NS
32	My parents usually compare my scores with other pupils' scores	3.30	3.00	1.76	NS	2.89	2.94	-.40	NS	2.62	2.76	-.42	NS

Table 10.9 (cont.)

Number	Item	High achievers				Average achievers				Low achievers			
		Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level	Pre-quest.	Post-quest.	T-value	Significance level
33	I like to know that my performance is better than others' in the class	3.69	3.76	-1.00	NS	3.07	3.11	-.31	NS	3.17	3.10	.33	NS
34	I do not like discussion in class	1.07	1.15	-1.00	NS	1.57	1.75	-1.07	NS	1.72	1.68	.13	NS
35	I do not like other pupils to get scores higher than mine	2.76	2.92	-1.00	NS	2.81	3.07	-1.96	NS	3.00	3.24	-.94	NS

The average achievers, too, indicated that via co-operative learning they had a better chance of participating actively in the learning process, understanding science, and feeling responsible for the learning of other pupils. The low achievers seemed to agree with the high and average achievers that with co-operative learning the possibilities for taking an active part in the learning process are greater, including in terms of sharing ideas, taking responsibility, and benefiting from others in the class.

10.6 Issues emerging from the observation of pupils, the pupils' questionnaires and the achievement tests

This section is concerned with a number of findings which emerge from analysis of the observation of pupils, the pupils questionnaire and the achievement test. One of these relates to the difficulties pupils had in respecting each others' opinions and listening to each other carefully. This was evident throughout the experimental programme. A number of reasons may be suggested for this. First, pupils are not used to working in groups and deriving benefit from working with each other in class. Secondly, respecting others' opinions and listening carefully to others are social skills which require time and training if they are to be acquired appropriately. The allowing of time and the provision of training, then, might be the solution to this problem.

Another point of interest concerns the difficulties some pupils had in understanding and following written instructions. The observers confirmed that the teachers complained about this, and reported that some pupils had difficulties in reading and comprehending written instructions. This problem caused some pupils, especially the

higher achievers, to complain about working with particular pupils and sometimes caused them to take over the role of reader in order to complete the task successfully.

In the post-questionnaire, pupils claimed that when they worked in small groups they made sure that everyone in the group learned the assigned task (the mean was 3.32). This seems to contradict observers' reports and checklists, which noted that for most of the time pupils failed to check on each other in order to ensure that everyone in the group learned the assigned materials. This suggests that most pupils are not certain what making sure that everyone in the group learns the task implies.

Interestingly, the findings from the achievement test revealed that the treatment group outperformed the control group in the post-achievement test. This suggests that pupils benefited from working in small groups in terms of achievement. Moreover, the high, average and low achievers in the treatment group agreed that co-operative learning offered a better opportunity for them to take part actively in the learning process than existing teaching methods.

Surprisingly, in their questionnaire answers pupils claimed that existing teaching methods are not boring, and do help them understand science. Moreover, they claimed that they do not find it hard to express their thoughts clearly in class. This is inconsistent with the researcher's own experience and observation as well as with the findings of previous studies (Al-Sada, 1992; Massialas and Jarrar, 1983). It may be that pupils thought that this answer was what the researcher wanted to hear, and therefore indicated that they do not have any problem in expressing themselves.

Another reason, perhaps, is that pupils like existing teaching methods because they are familiar with them and do not know alternatives.

Chapter 11

Discussion of the Findings

11.1 Introduction

This chapter discusses the issues which emerge from analysis of the quantitative and qualitative data in relation to the findings of the studies reviewed in the background and literature review chapters. The discussion is divided into four main sections, as follows:

1. The concept and methodology of co-operative learning.
2. Outcomes of co-operative learning, including achievement and social development.
3. The essential conditions for co-operative learning, including teacher training, assessment, curricula and resources, and provision of support by colleagues and school administrators.
4. Obstacles to co-operative learning, including time and effort required for implementation and behavioural problems in the classroom.

11.2 The concept and methodology of co-operative learning

In Chapter 4, we saw that current views on children working together in small groups differ from one culture to another. For example, in the United Kingdom the small group is the norm. The Government is paying close attention to this method. In the science curriculum, for example, the attainment target for exploration and investigation demands that pupils should be able to work in groups effectively. Attainment target 18 states:

> Pupils should develop the ability to work effectively as part of a group in the planning, carrying out, reporting and evaluation of an investigation or task. (DES, 1988, p. 56)

Moreover, the curriculum demands that teachers assess pupils aged 7 to 11 in terms of their ability to:

- offer ideas and initiatives for groupwork;
- take on a share of a task as determined by the group;
- persevere with a task;
- show sensitivity to the needs and limitations of individuals within the group. (DES, 1988, p. 57)

The above quotations highlight the fact that groupwork is an integral part of the Science National Curriculum in the United Kingdom. Therefore, UK studies have been concerned with improving existing practice, addressing, in particular, teacher–pupil and pupil–pupil interaction. They have built on what already exists and what teachers are familiar with. In the United States, on the other hand, didactic teaching is the norm. The Government does not foster groupwork, nor does it oppose it. Therefore, US studies have been concerned with examining the effectiveness of groupwork in terms of outcomes such as achievement and social development. These studies tend to be experimental in nature, involving treatment and control groups and test-specific hypotheses related mainly to achievement and social gains. It should be stressed that groupwork is not new to the education system in the United States. A number of teachers are familiar with it, and some school districts adopt it as the norm.

In the Middle East, however, teaching in small groups is completely new. The Ministry of Education in Qatar does not foster it, nor are teachers familiar with it. However, the SCPS stresses that pupils should be given an active role during the learning process; they should carry out experiments individually or in small groups.

Nevertheless, teachers in Qatar are not given any means (training, guidelines) of adopting small group learning. On the contrary, the education system in Qatar, as indicated in Chapter 5, encourages competitive learning. Since co-operative learning is a new method, teachers, pupils, parents and administrators are unfamiliar with it. Therefore, in this study it was important to familiarise the Ministry of Education, school principals, teachers and pupils with co-operative learning before implementing the experimental programme. It is only recently that researchers in the Middle East have begun to examine the potential for co-operative learning.

Previous Middle Eastern studies have introduced no fresh approach, however; they have simply copied the US approach without taking into account cultural factors. The present study has, therefore, adopted a new approach to examining the effectiveness of co-operative learning. This approach is basically outcome- and process-oriented, in that outcomes such as achievement and social gains were examined and pupil interaction and behaviour observed. Moreover, the interaction of teachers with pupils was also observed. This approach afforded a better understanding of the variables under study and gave more accurate answers to the research questions. It should be noted that, although the researcher was concerned that observers and teachers in Qatar would not respond to the qualitative instruments (diaries and interviews) positively because they are not used to expressing their opinions frankly, the response rate was satisfactory. The researcher received 91 per cent of the teachers' diaries and all the observation schedules expected.

Another point related to the concept of co-operative learning is that, as was noted in Chapter 4, there are a number of definitions of and strategies for co-operative learning, as well as variations among them. Most of these, it was argued, focused on the physical arrangement of the pupils, while neglecting the crucial role of the teacher and the importance of well-structured tasks. The findings of the present study confirm the belief of the researcher that the teacher's role and well-structured tasks are equally important in effective co-operative learning. During the training programme teachers were particularly concerned about these three elements (pupils' roles, teachers' roles and task structure) in co-operative learning. For example, in their diaries and in interviews (see Tables 8.4, 8.5, 8.9 and 9.2) teachers reported a large number of difficulties and obstacles in taking on board co-operative learning, including the following:

1. Teaching methods such as co-operative learning require appropriate training, especially for teachers, which is not available in Qatari schools.

2. Helping both pupils and teachers master their roles and acquaint themselves with the essential skills for groupwork requires time and effort.

3. Structuring a task appropriately for co-operative learning requires training, time and effort.

The above findings indicate that teachers in Qatar were aware of the importance of pupil, teacher and structured task in any groupwork situation. In fact, during the experimental programme teachers evaluated pupils' performance as well as their own. Moreover, some of them related the poor quality of the first lesson to their own limitations as well as to their pupils'. One teacher evaluated his performance during the first lesson as follows:

> I personally believe that the lesson was below average. I could not adopt the role of teacher to manipulate the groups as I was expected to do. The pupils also did not perform their roles well. (HA, p. 2, ll. 23–6)

These findings are supported by many other researchers, for example Bennett (1994), Cohen (1992), Johnson and Johnson (1992), Galton (1981) and Kutnick and Rogers (1994). These writers point out that structuring tasks appropriately, and training both pupils and teachers, are essential for the successful implementation of co-operative learning.

11.3 Outcomes of co-operative learning

This section discusses the findings related to pupils' behaviour and interaction, to pupils' perceptions drawn from the pupil questionnaires, and to the observation of pupils. It also discusses the findings of the achievement test in relation to previous studies.

11.3.1 Pupil performance

Pupil performance was one of the major issues examined in this study, representing as it does a major concern for teachers and for the education system in Qatar. Moreover, in the review of literature it was shown that there are inconsistencies in the studies reviewed as regards the effect of co-operative learning on pupil performance. For example, some of the studies found that co-operative learning methods produce the best performance, whereas others found that competitive or individualistic methods were as effective or better. In general, the findings cited by US researchers concerning the role of co-operative learning in improving pupil achievement are impressive (Johnson and Johnson, 1985, 1987; Johnson *et al.*, 1981; Slavin, 1983, 1989–90;

Newmann and Thompson, 1987). Although British studies are more conservative as regards the quantitative outcomes of co-operative learning, Galton and Williamson (1992) conclude that pupils are likely to achieve more if they are encouraged to work co-operatively towards a common goal or if they make an individual contribution to complete a common task. Also, although only a small number of studies have been carried out in the Middle East, most of them reported that co-operative learning methods were shown to be superior to traditional teaching methods in increasing pupil achievement (Qa'ud, 1995; Nouh, 1993; Dumiati, 1992; Al-Faleh, 1981).

In general, the findings of this study support the claim that the co-operative learning method results in better pupil performance than traditional teaching methods. The findings show that there were significant differences between the treatment and the control groups in their performance on the post-test, with a statistically significant difference in favour of the treatment group (see Table 10.5). A number of reasons can be drawn from the findings to explain why pupils in the treatment group outperformed their counterparts in the control group. For example, pupils were encouraged to work together towards a common goal in which every pupil contributed to complete a common task (Galton and Williamson, 1992). To give another example, evaluating both individual performance and a group product helped to increase achievement (Qa'ud, 1995). Another reason was that assigning pupils to a mixed ability group provided the opportunity for them to learn from each other, especially the average and low achievers (Qa'ud, 1995; Slavin, 1983). Finally, encouraging experiential learning, in which pupils are responsible for learning, discussing, observing, reading and producing ideas helped to increase pupil achievement (Qa'ud, 1995).

However, the findings do not support the assumption that co-operative learning provides the greatest gains for low and middle achievers. To be precise, no significant differences were found between the high, average and low achievers. These findings may generate further research-related questions, such as:

1. Would co-operative learning produce the same result with a larger scale study?
2. Would co-operative learning produce the same result with pupils of different ages?

These questions should be examined in the context of a clearly-thought-out research project, possibly conducted by researchers from the Ministry of Education or other educational institutions. This suggestion is based on the fact that resources for research activities are usually controlled by the Ministry of Education, and educational institutions have easy access to these resources (UNESCO, 1990).

11.3.2 Pupils' social gains and perceptions

Pupils' social gains were examined in this study along with their perceptions of co-operative learning. Data obtained from the teachers' questionnaire on this issue suggested that teachers had high expectations regarding the social benefits of co-operative learning. They agreed that co-operative learning enhances self-esteem, develops social skills (co-operation, accepting others' points of view), increases pupils' motivation and interaction, and fosters better relationships among pupils (see Table 7.7). The question which emerges here is, if the majority of teachers in Qatar (male and female) believe that co-operative learning can produce all these social benefits, why do they not use it? It seems as if they believe one thing and practise something else. Similarly teachers, in the diaries they kept during the training

programme and in their interviews before implementing the experimental programme, made large claims for the social benefits of co-operative learning (see Tables 8.8 and 9.2). These data also serve to indicate that teachers do not practise what they believe in. One reason for this is the centralisation of the Qatari education system. This study has revealed that teachers do not have the freedom to apply the teaching method they consider best suited to their classrooms. They indicated that educational advisors and school administrators may interfere in their teaching and assessment methods.

Teachers' positive expectations about the social gains of co-operative learning accord with previous findings (Johnson and Johnson, 1985; Sharan, 1980; Aronson *et al.*, 1978; Slavin, 1987b). In this context, Aronson *et al.* (1978), for instance, made the suggestion that children grew to like their group members more than other pupils in the class. Similarly, Slavin (1987b) found that pupils showed a greater liking for their groupmates as a result of participating in groupwork processes. However, in the present study, teachers' agreement with previous reports about the social benefit of co-operative learning was not unchallenged. In their questionnaires, teachers expressed a number of concerns and anticipated some social difficulties, including the following:

1. A pupil may not appreciate the contribution made by his peers.
2. High achievers may ridicule lower ones.
3. Some pupils prefer to work on a friendly basis.
4. High achievers may control the groups and limit the contribution of lower achievers.

Examined closely, these difficulties seem to be very real. Some of them, especially those related to the types of interaction between high and low achievers, are consistent with the findings of King (1993) and Bennett and Cass (1988). For example, King (1993) states that low achievers:

> clearly were susceptible to mediating influences that seem to derive from the dominant leadership style of high achievers, the interpersonal dynamics prevailing among group members, the lack of significant influence on the progress of the group, and their self-perceptions with regard to personal progress in mathematics. (p. 414)

In Britain, moreover, Bennett and Cass (1988) found the following:

1. In groups made up of two high achievers and one low achiever, the low achiever seemed to be ignored, and as a result misunderstood the assigned task and the decisions being made by the group.

2. High-achieving pupils performed well, regardless of the type of group they were in.

The findings of this study were similar. The low achievers were less active and were afraid of mistakes, the reason being that when they made mistakes the high achievers complained and responded to them negatively. This caused the teacher to intervene and encourage all pupils to enact their roles and give each other an equal opportunity to participate and contribute to group process – the result of which is described in Chapter 10. Data from observation also indicated that pupils had great difficulty listening to each other carefully and discussing and encouraging each others' ideas.

Further, there were indications that some pupils controlled the group and dominated the discussion. For example, one observer recorded that

> the pupil was performing the manager's role, tried to control the group and he succeeded. (IS, 3.12.94, p. 2)

From conversations with teachers it was noted that some high achievers were trying to dominate the discussion in the group and limit the contribution of the low achievers.

Some teachers seemed to be aware of this problem and tried to overcome it by intervening in the group process to encourage all pupils to contribute to the task and enact their roles adequately. For example, after teaching the first lesson one teacher said the following:

> I think that rapport among the pupils was not achieved at the beginning of the lesson since the pupils are not used to working in groups ... and some pupils were passive during the group process ... I tried to encourage them to participate. (SA, p. 1, ll. 11–14)

The point needs to be made that pupils cannot change overnight: they need time and practice to be able to work effectively as members of a group. After implementing co-operative learning, teachers reported the following in their diaries (see Table 9.3):

1. The pupils' enthusiasm for co-operative learning was evident throughout the experimental lessons.
2. The majority of pupils enjoyed working in groups.
3. The pupils' active participation in the class increased.
4. Groupwork increased the pupils' sense of responsibility.

The data from observation is similar. For example, one observer described a lesson by one of the teachers as follows:

> After the reader had the sheet of instructions, the discussion started ... they divided the task among themselves ... then they discussed together the task and answered the questions ... the recorder's role was very clear – he was in charge of summarising the answers agreed upon and writing them down ... Verbal participation was clear from all members of the group except the encourager, whose participation was limited. The group was working with clear enthusiasm throughout the lesson ... however, the pupil who was performing the manager's role tried to control the group, and he succeeded for 15 minutes, but the teacher intervened and encouraged all pupils to perform their roles. (IS, 3.12.94, pp. 1–2)

These points appear to demonstrate that teachers take a positive view of co-operative learning. Moreover, these points and the quotation above suggest that co-operative learning gives pupils an active role in the learning process, encourages pupils to share

ideas and materials, and develops a sense of responsibility on the part of pupils towards their learning environment. Data obtained from the observation of pupils also shows that pupils were contributing verbally in the groups and helped each other to complete the assigned materials (see Table 10.1). The present findings, then, point in two directions. Nevertheless, they point more towards the positive social effects of co-operative learning. This suggests that educators need to work to overcome the kinds of difficulties identified in this study. One way to improve the effectiveness of small groups, as suggested by teachers in their interviews, is to train pupils carefully to work in small groups. Teachers suggested that pupils need time, training and practice in order for them to work in groups appropriately. A second suggestion is to introduce co-operative learning in gradual stages, starting at a very early stage of childhood. At this point, it should be stressed that obtaining more process data on pupils' social development, interaction and perceptions is important. There is a need for research which will look in detail at the processes of interaction, communication, role playing and decision-making which occur in group situations. Such research would help to examine some of the areas which the present study could not.

11.4 Essential conditions for co-operative learning

This section discusses the findings related to the essential conditions for co-operative learning (resources and curricula, teacher training, teacher and administrative support, and assessment), with particular reference to the findings regarding cultural difficulties in implementing co-operative learning in Qatari schools.

11.4.1 Teacher training in relation to co-operative learning

Taken together, the findings of the previous studies serve to emphasise the considerable skills needed to implement co-operative learning successfully. Several authors stress that teachers should master certain skills and elements of co-operation before any implementation of co-operative learning takes place (Cohen, 1992; Holubec, 1992; Johnson and Johnson, 1992). Kutnick and Rogers (1994) make a similar point:

> Without training for effective group work, there is only a limited likelihood that work in small groups will be successful. (p. 9)

Moreover, Johnson and Johnson (1991) stress that training to master co-operative learning should be based on experiential learning, in which the trainee learns from experience. Therefore, in the present study the training programme was designed to help teachers:

- gain conceptual knowledge about co-operative learning theory and research
- translate the knowledge into practical skills
- practise their practical skills in real situations
- eliminate errors in using the skills through self- and peer evaluation

Adopting the experiential learning approach was particularly important for teachers in Qatari primary schools, because of the lack of adequate in-service programmes provided by the Ministry of Education. Al-Atari (1989), for example, maintains that teachers in Qatar are insufficiently qualified owing to a lack of adequate training programmes. Even teachers who received appropriate pre-service training need adequate in-service training to improve their skills and update their knowledge.

According to the UNESCO Report (1990) teachers in Qatar attend only one in-service training session every three or four years. The report suggests that the number of in-service programmes in Qatar should be increased and their quality improved. Similarly, Kamal (1990) stresses that teachers in Qatar need adequate training in order to be able to apply methods that deviate from the traditional lecturing method. The present findings support this point. As Tables 8.5, 8.9 and 9.2 show, teachers believed that provision of appropriate training is extremely important if they are to employ teaching methods such as co-operative learning.

In their evaluation of the training programme teachers reported that the workshop covered both the theoretical and the practical aspects of co-operative learning, which helped them to understand this teaching method. Moreover, the activities were practical and required groupwork to complete them (see Table 8.10). Further, to quote from the findings, one teacher said the following:

> At this workshop I gained an opportunity to think about some teaching problems, and possible solutions. Moreover, working in groups was very helpful in saving time and accomplishing the task. (SA, p. 2, ll. 12–15)

Also, certain facts emerge in the findings with regard to the workshop training, and these are presented in Chapter 8. The teachers identified several features about the workshop training that they liked. These included the following:

1. They could get acquainted with new colleagues.
2. It provided them with an opportunity to discuss ideas, problems and concerns freely.
3. They could update their knowledge of new trends in the teaching of science.
4. They could develop social skills via the group process.

5. They could take responsibility and become active learners through role playing.

6. They could develop their scientific skills via investigation and problem solving.

7. They could exchange experiences and argue about ideas.

8. Participants were encouraged to work in pairs or groups to complete the activities and exercises.

9. Learning centres were provided for additional information, resources and materials.

10. Training was used which emphasised experiential learning.

It was perhaps because of these features that the teachers were supportive and enthusiastic throughout the training programme. Moreover, teachers suggested that this programme should be submitted to the Ministry of Education so that it could benefit from it in training teachers to employ new teaching methods.

Taking the findings as a whole, it is clear that teachers are calling for an interactive training programme, which adopts a learner-centred rather than an instructor-centred approach. Role playing, group process and social context are the main components of this approach. Judging by the researcher's own observations, teachers were committed to performing the roles given to them throughout the training programme adequately. They were given only initial instructions about their roles (manager, reader, communicator and recorder), and were asked to respond as circumstances seemed to require. Although this type of activity (role playing) represented a new experience for teachers, they accepted the initial assumption and behaved accordingly.

Another point of interest concerns the group process (the way in which the groups of teachers were functioning). At the beginning of the training programme they were reserved; their communication and interaction were limited. But later they started to communicate, interact and cope with disagreement effectively. To quote from the findings, on the second day of the training programme one teacher said:

> The discussion was much better than on the first day. (HA, p. 2, ll. 7–9)

Another teacher also expressed positive feelings about working in groups:

> ... working in groups was very helpful in saving time and accomplishing the tasks. (SA, p. 2, ll. 12–15)

Other teachers reported that they gained new experiences through exchanging and discussing ideas. Teachers also appreciated the social context of the training programme. Most teachers reported that they were pleased with the social nature of the workshop as they got acquainted with new colleagues and discussed freely important issues relating to the teaching of science.

In-service programme providers should, then, pay careful attention to the above points when designing or conducting training programmes. In this context, Chapter 12 attempts to develop a model to help in-service programme providers to improve the effectiveness of their programme.

11.4.2 Resources, curricula and learning aids for co-operative learning

In Chapter 5, it was noted that the use of co-operative learning requires a great variety of instructional materials, as stressed by Cohen (1992). Bellon *et al.* (1992) emphasise this point:

> If teachers and students are to be successful, they must have the resources necessary to do quality work. Basic resources such as adequate materials, supplies, and equipment,

> should be available to all teachers. In spite of all the attention being given to reforming education, many schools still do not have the resources necessary to carry out their instructional programme. (pp. 18–19)

This is especially true as regards instructional methods such as co-operative learning. Good *et al.* (1989–90) stress that providing teachers with materials designed expressly for co-operative learning is extremely important. Cohen (1992) was extremely concerned about the potential of co-operative learning in the United States in the absence of adequate resources:

> There is a real danger, it would seem, of failing to give teachers the help they need with curricular materials. They have little time, resources, or preparation for the development of such materials. With routine materials, one would predict that students would rather quickly tire of working in small groups. Thus the failure to solve the problem of materials may be one of the causes of the rapid decline of this innovation. (p. 64)

This is one of the main problems teachers in Qatar are facing. As was noted earlier, a UNESCO report (1990) found that curricula in Qatari schools are characterised by content that is both too condensed and full of topics which are irrelevant to the Qatari context. In addition, the report points out that schools and the Educational Technology Department are not giving attention to providing and supplying laboratories and teachers with the resources and materials they need. The report further claims that there are some schools without laboratories, and that even those laboratories which do exist tend to be badly equipped. Hameed (1981) stresses that teachers in Qatari schools are excluded from curriculum planning and are not allowed to modify the curricula. It is therefore difficult for teachers to implement new teaching methods which require modifications in curricula without the permission of the Ministry of Education.

The empirical findings, and the experience of the researcher during fieldwork for the present study, support the claims made by the UNESCO report (1990) and Hameed's (1981) study. Teachers in Qatari primary schools share the same concerns that Cohen (1992) expressed about the potential of co-operative learning in the United States (see Tables 7.10, 8.4, 8.5, and 8.9). For example, the researcher encountered great difficulties in ensuring that the materials needed for teaching pupils in groups were provided. It was found either that the materials did not exist or that there were severe shortages. Surprisingly, in the present project, although teachers who implemented co-operative learning in classrooms had at least five years' experience, most of them were not sure whether or not the materials were available; they had to search for them or ask colleagues, and often an answer was not available. When teachers were asked how they overcame the shortage of materials, they responded, 'Basically we buy them from our own pockets.' The teachers also claimed that they are not allowed to ask pupils or parents to provide any materials or even to help in providing materials and resources for schools. The researcher, then, had to provide all the materials needed for both the treatment and control groups throughout the experimental lessons, using his own resources.

During the implementation of this study, the laboratory of one of the schools could not be used for the experimental lessons because it was still under construction, and so the library was used instead. Even when the laboratory was completed, the researcher had to obtain permission from the principal to use the laboratory for the experimental programme, because there was only one laboratory which was shared by all levels from first to seventh grade.

The empirical findings (both quantitative and qualitative) showed that teachers expressed great concern about the lack of adequate resources and materials, which hinders the use of co-operative learning in Qatari primary schools. For example, one teacher wrote this in his diary on the final experimental lesson:

> Although my pupils liked the co-operative learning method, this method is not suitable for Qatari schools, because classrooms are inappropriate, resources are not available and classrooms are overcrowded. (AS, 3.12.94, ll. 19–21)

Most science teachers in Qatari primary schools agreed with this claim. Data collected from different sources confirmed it (see Tables 7.10, 8.4, 8.5, 8.9, 9.1 and 9.2). Teachers reported a number of resource-related problems, including the following:

1. There is a shortage of equipment.
2. Buildings are inappropriate and classrooms are not designed for small-group learning.
3. There is a lack of suitable books about teaching methods.
4. The curriculum needs to be redesigned to suit co-operative learning.
5. Laboratories are not appropriate for co-operative learning.
6. There is a shortage of materials designed for groupwork.

Taken as a whole, the findings suggest that there is a real problem with materials and resources in Qatari primary schools. Co-operative learning methods highlight the importance of resources and materials in schools and the urgent need to think carefully about their provision, allocation and use. What must every class and laboratory have? What range of scientific materials and resources is necessary, and where should these be located? Should there be a school resource centre, or class libraries, or both? Should parents and pupils be involved in the provision of resources

and materials? How much of the school allowance should be spent on resources and materials? How much duplication of resources is necessary? These are among the questions which should be asked and in the end resolved by means of a clearly-thought-out plan and practical programme. Financial conditions always limit what may be obtained and thus priorities should be established in the context of a short, medium or long term plan.

11.4.3 Assessment in co-operative learning

Assessment of groupwork was also examined in this study. In fact, examination is one of the most difficult issues facing educators in Qatar. Because they place great emphasis on examination, promotion of pupils from one stage of education to another, or from one grade to the next, is based solely on examinations. Therefore, during the training programme some teachers encountered great difficulty in understanding the concept and procedures of assessment in co-operative learning (see Table 8.4). Moreover, they raised very important questions related to assessment in co-operative learning, such as: How can we make sure that all pupils have learned the assigned materials? How well have they worked together – how can we identify the contributions in a group product? How can one teacher, unaided, observe six groups at the same time? Although teachers were given advice to help them overcome these difficulties, results from the teachers' observations suggest that some teachers were able to assess pupils individually and as a group, while others seemed to struggle to achieve this (see Table 9.5). Teachers in the experimental lessons gave group grades for a group product and posted the grades on the wall. However, some teachers reported that this method of assessment caused some problems in the groups. If one

pupil in the group is felt to be incapable of performing the task, the group is likely to ignore his contributions. On the other hand, the high attainers who have the relevant knowledge will be encouraged to take over the task on their own. These difficulties are not experienced only by Qatari teachers. They are consistent with the findings of Bennett and Dunne (1992), who indicate that teachers often find assessing pupils engaged in groupwork a rather difficult task:

> Assessment of groupwork is particularly difficult because of the interweaving of both social and cognitive aspects of co-operative working and the complexity of relationships which may develop and lead to different kinds of interaction and learning. (p. 187)

Another reason for these difficulties might be that in Qatari schools, teachers are not used to this kind of assessment, often using essay questions to assess pupils' achievement on an individual basis (Tolefat, 1983). These questions mainly measure verbal knowledge and memorisation (UNESCO, 1990).

As can be seen, the findings relating to Qatari teachers are complex. Teachers need time and practice in order to change their method of assessment, which mainly focuses on memorising facts, and undertake a new approach which focuses on quality of learning (measuring both social and cognitive aspects). But the main question teachers raised is whether, even if they mastered this method of assessment, the Ministry of Education would approve assessment which measures the quality of learning. This concern stems from the fact that teachers in Qatar do not have the freedom to apply the teaching or assessment methods they think are suited to their classrooms. In their interviews before implementing the experimental programme, they indicated that educational advisors and school administrators may interfere with their teaching methods. Moreover, they claimed that they are sometimes forced to

make changes to examination questions because the authorities are concerned only with pass rates. Only one teacher considered that, so long as the technique he employs offers the same degree of success as the traditional method, he can use any technique. These concerns are highlighted by the findings of Massialas and Jarrar (1983), who have this to say about assessment in the Arab world, including Qatar:

> It is generally claimed that the exams, especially school-leaving exams, do not measure comprehension but memory. This is based on the fact that the exams are extensions of the Ministry's syllabi and approved textbooks and there is a lack of realization on the part of the supervisory personnel of what children can actually do in school. (p. 104)

Of course, under these conditions teachers find themselves forced to gear their teaching and assessment to their pupils' success in exams. Otherwise they are blamed by educational supervisors for low achievement on the part of pupils. The need now, as one teacher suggested in his diary entry (see Table 8.9), is for a new system to be established to accord with the co-operative learning method. The syllabus, teacher training, school administration, assessment, education policies and the responsibilities of inspectors all need to be reconsidered. This will require the contribution of a great many people, at all levels.

11.4.4 Teachers and administrative support

Teachers and administrative support are recognised to be important factors for implementing co-operative learning or introducing innovation successfully in classrooms. For example, Johnson *et al.* (1986) maintain that, for the implementation of co-operative learning to be successful:

> teachers need support and advocacy from building and district administrators. Administrators must understand what co-operative learning strategies are and be able to recognise them in teachers' classrooms. As well as supporting teachers who are struggling to master co-operative learning strategies, administrators should structure teacher/teacher work and relationships co-operatively to demonstrate their support for the use of co-operative strategies in the classroom. (p. 89)

However, the results obtained from the teachers' diaries (see Table 8.2) suggest that teachers blame school administrators for lack of support and co-operation in the adoption of new teaching methods. Moreover, data obtained from the interviews with teachers and from the diaries also shows that teachers were concerned about interference from school administrators and educational advisors (see Table 8.9). The reason for this is that administrators and educational advisors are concerned only with the quantitative success of pupils, regardless of qualitative criteria. These findings are consistent with the observations of Hameed (1981) and Al-Ibrahim (1980) that the only role teachers play in Qatari schools is that of carrying out orders from school administrators and the Central Office. In their diaries (see Table 8.2), teachers complained about the burdens placed on them inside the school, such as a large number of periods, administrative work, supervision and school activities. This suggests that administrators in Qatar are not paying attention to improving the quality of learning and teaching, but rather are focusing on keeping teachers busy all the time.

These findings are consistent with those of Ghannam (1984), who concludes that in Qatar, educational administration is characterised by a lack of expertise in coping with recent trends in education, by technological literacy, and by centralisation in financing and developing policies. In their diaries (see Table 8.3), teachers clearly asked for the following so that teaching in Qatari schools might be improved:

1. Increased co-operation between school administrators and teachers, to improve teaching methods and avoid interference by administrators in teachers' teaching methods.

2. A reduction in the administrative and supervisory responsibilities of teachers so that they can concentrate on improving their practice and on helping pupils.

In some ways, one of the key elements for successful teaching is the support of colleagues. Teachers perform better when they have support from their peers. Johnson *et al.* (1991) describe the co-operative school as follows:

> Schools are not buildings, curriculums, and machines. Schools are relationships and interaction among people. How the interpersonal interaction is structured determines how effective schools are ... School effectiveness depends on the interpersonal interactions being orientated toward co-operatively achieving the goal of the school ... The co-operative school consists of co-operative learning within the classroom and co-operative efforts within the staff ... Within the school, colleagial support groups, [and] task forces or committees should meet regularly and frequently. (S. 7:2)

In their interviews, some teachers reported that they faced criticism from their fellow teachers. They said that some of their colleagues claimed that they had tried co-operative learning before, but it had not worked. This attitude, these teachers said, had a negative effect on them. However, other teachers said that they did not worry about criticism from fellow teachers (see Chapter 9).

It is clear from the above that if the co-operative learning method is to function successfully in Qatari schools, full support and understanding from school administrators, educational advisors and fellow teachers is essential. In this context Galton and Williamson (1992) suggest that to be able to develop the necessary commitment to co-operative learning teachers must be confident that the headteacher and the education authority understand and support this change.

11.4.5 Cultural difficulties in implementing co-operative learning

As was indicated earlier, collective activities which require co-operation, joint contributions and the division of labour reflect genuine Islamic values, both in principle and via application through acts of worship and everyday dealings, and are

also consistent with Qatari culture, especially as it evolved during the pre-oil era. However, the findings of the present study provide no evidence that educational institutions, via their curricula and activities, make any effort to strengthen the values of co-operation and joint responsibility. On the contrary, the education system in Qatar is based on the principle of competition and rivalry. Teaching methods which depend mainly on dictation do not encourage co-operation and interaction. The assessment system is based on measuring who is the best pupil in class. Pupils usually receive certificates in mid-year and at the end of each semester, and these certificates rank pupils according to their educational achievement. Various school activities, sporting, social and cultural, also enhance competition. For example, competitions are organised for writing the best essay, the best story, the best poem, and for drawing the best painting, etc. Meanwhile, there is no competition worth mentioning which aims at promoting collective activity among pupils, such as common projects which require co-operation and a division of labour. Such projects may encourage students to work towards a common goal, which may serve to enhance their collective and common interests.

Results from teachers' diaries (see Table 8.9) show that teachers were concerned about pupils in Qatar being used to traditional teaching methods which promote competition and recitation of information. Teachers suggested that time and effort will be required to change their habits. These findings are consistent with those of Al-Sada (1992), Kamal (1990) and Massialas and Jarrar (1983). They stressed that pupils in the Arab world, and especially in Qatar, are treated as passive recipients: they do not play any active role in the learning process. It would be unfair to relate this state of affairs

in the classroom only to teachers. The system itself, and society, must assume the largest degree of responsibility for encouraging children to compete with others, and for marginalising children's roles both in school and in the wider community.

Data obtained from the teachers questionnaire (see Table 7.9) indicate that parents in Qatar encourage their children to compete, and that society encourages competition as well. There is also evidence from the pupils questionnaire (see Table 10.2) that pupils like to know that their performance is better than that of others in the class. In their diaries and interviews, teachers also expressed their concern about lack of co-operation on the part of parents in encouraging their children to share ideas and materials and to take responsibility for helping other pupils in the class to master the lessons. Moreover, teachers felt that the society is at present committed more to competitive lifestyles than to co-operative ones.

The above findings are compatible with those of previous studies (Al-Kurdi *et al.*, 1985; Zioure, 1977). For example, Al-Kurdi *et al.* (1985) argue that the economic boom has led to changes in the social values of Qatari society. The society has become more competitive and family-centred, with parents encouraging their children to compete to obtain better degrees and better job opportunities. Zioure (1977) maintains that parents in the Arab world always expect their children to be obedient and well-disciplined. They usually compare their children's performance with that of other children. Moreover, they encourage their children to compete with other children to get better scores. Zioure goes on to argue that these expectations can make some children reluctant to learn and can lower their self-esteem. Although there is

much to be learned about the actual cultural difficulties in implementing co-operative learning in Qatari schools, the findings of this study, presented via both quantitative and qualitative data, indicate that cultural factors such as parental expectations and adult–child relationships influence attitudes towards co-operative learning. In other words, in some cultures it may work better, while in others it might present difficulties. The question which emerges is, would parents in Qatar support the use of co-operative learning in primary schools? Would they express any concerns about the use of co-operative learning? There is a need for a study which will take into account the cultural factors involved in implementing co-operative learning.

Although school administrators, society and parents did not interfere during the implementation of this study, teachers expressed great concern about potential cultural difficulties (see Tables 7.9, 8.5 and 8.9). It is essential that cultural differences be taken into account when implementing this particular method. Suggestions regarding this point will be provided in the next chapter.

11.5 Obstacles to co-operative learning

This section discusses the findings related to the limitations of co-operative learning as perceived by teachers in Qatar. It also discusses the findings relating to pupils' behavioural problems obtained via the pupils' observation instrument.

11.5.1 Difficulties related to time and effort

Data obtained from the teachers questionnaire (see Table 7.8), the teachers' diaries (see Tables 8.5, 8.9) and the interviews with teachers (see Table 9.2) indicate that

teachers were greatly concerned about the time and effort required to plan and implement effective groupwork even before they had implemented co-operative learning in the classroom (see Tables 7.8, 8.5, 8.9). Moreover, they continued to have the same concern after they had implemented co-operative learning (see Tables 9.2). Teachers expected to encounter the following time-related difficulties in implementing co-operative learning in Qatari primary schools:

1. The time teachers have available for completing the syllabus is not sufficient for them to adopt co-operative learning.

2. In co-operative learning, lesson planning requires much more time and effort than with the traditional approaches. The teachers' burdens are increased.

3. Helping both teachers and pupils accustom themselves to these different roles and acquaint themselves with the essential skills for groupwork may take a long time, at the expense of the syllabus, particularly since this is a new technique.

This last argument is strongly supported by Hawley and Rosenholtz (1984), Merrett (1994) and Sharan and Sharan (1976). Merrett (1994) argues that co-operative learning is more demanding in terms of time and effort than individualisation. Also, time and effort are required in evaluating the outcome of each individual child, monitoring the progress of each, and managing the group's conflicts and arguments. Given all these demands on teachers it is difficult for them to assess whether or not pupils have done useful work and who is doing most of it. Hawley and Rosenholtz (1984) argue also that training pupils to work effectively in small groups, establishing new rules, roles and procedures, and planning for groupwork, require additional time and effort. Given these conditions, some teachers in Qatar argue that the direct teaching method is a mode of instruction that fits the structure of most schools in Qatar.

11.5.2 Behavioural problems

The major problems teachers involved in the co-operative learning method experience with pupils have been described in Chapter 5 (pp. 110–12). The findings of this study accorded with the above. They indicated the occurrence of a number of disruptive behaviours during groupwork (see Table 10.1). It was found that pupils were exhibiting some off-task behaviours, mainly non-task talking, daydreaming, wandering around and attempting to gain attention. These disruptive behaviours varied from classroom to classroom. For example, teacher MM experienced only a small number of disruptive behaviours (see Table 10.1). This may be related to the length of the teacher's experience, the number of pupils in the classroom or the nationality of the pupils in the class. MM had at least seventeen years' teaching experience; his classroom size was 25 pupils, and these pupils were of mixed nationalities, mainly non-Qatari, while the other teachers had a maximum of five years' experience each and an average of 32 pupils in a class, the majority of whom were Qatari. This caused some teachers to complain about classroom control, and in particular about too much noise and disruptive classroom behaviour. Another factor which might be related to behavioural problems is that of inappropriate classroom and laboratory facilities. In Qatari primary schools, the rearrangement of furniture for co-operative learning is always necessary. This in turn means that teachers need to be specifically prepared for the kinds of arrangements, materials and problems which are required for working in groups. If teachers fail to prepare adequately, serious problems are likely to occur. For example, one observer reported the following:

> At the beginning of the lesson, the teacher had no control over his class because of the basic fact that the laboratory was not ready to receive the pupils in groups. But within around three minutes, the teacher started to gain control over the class. (AA, 29.11.94, p. 1, ll. 8–10)

This suggests that co-operative learning requires that the laboratory be arranged prior to the class taking place. When the teacher failed to take this into account he faced some problems, and wasted some time in rearranging the laboratory and recontrolling the class. It seems, however, that these problems are not confined to co-operative learning, as Johnson and Johnson (1987) indicate:

> Within most traditional classrooms there are students who are resistant to teacher influence, unmotivated to learn what is being taught, non-responsive to the usual rewards teachers have to offer for appropriate behaviour, and inappropriately aggressive, hostile, obstructive, irritating and disobedient. (p. 165)

Moreover, as noted earlier (Chapter 5), Galvin *et al.* (1994) reported that patterns of behavioural problems such as physical aggression towards peers, verbal aggression towards peers, verbal aggression towards staff, inattention to task and out-of-seat activity occur not only in groupwork but also in the situations they described as individual work, teacher talk and activity change (see Table 5.1).

Although the data described above were obtained in differing cultural contexts, they indicate that similar behavioural patterns occurred in co-operative learning settings. There is much still to be learned about pupil behaviour in small-group settings, but the findings of the present study should alert educators to potential problems. Although this study was not centrally concerned with finding solutions to the behavioural problems that occur in small-group settings, something should be said about this in the context of preventative measures and solutions. In fact, there is a literature which addresses this issue and outlines a number of preventative measures and solutions to deal with behavioural problems. Johnson and Johnson (1991), for example, argue that group members can help with a disruptive pupil if the teacher trains them in procedures that control the pupil. They claim that the proper use of co-operative

learning will prevent most discipline problems from arising, or at least will reduce inappropriate, non-responsive and obstructive behaviour in the classroom. A second means of controlling disruptive behaviour is by strengthening the monitoring system through systematic rules and a clear system of reward and punishment. Probably the most successful means of achieving this is to structure the task for groupwork carefully (Galvin *et al.,* 1994). The task should be clear, and planned so as to promote interdependence.

11.6 The underlying problem in developing co-operative learning in Qatar

Having discussed the concept and the outcomes of co-operative learning, the essential conditions for co-operative learning and the obstacles to co-operative learning, we find one question emerging, which is, given these circumstances, is it practical to introduce co-operative learning on a large scale in Qatari primary schools? The following discussion attempts to answer this question.

One of the many aims of this study was to gain information regarding the practicality of implementing co-operative learning on a large scale. Earlier, in the background chapters (Chapters 2 and 3), it was noted that teaching methods in Qatari schools do not correspond to the needs of pupils. For example, Kamal (1990) stresses that the common procedure for teachers in Qatari schools is to lecture on a daily topic. What little time remains is reserved for completing exercises related to the topic and assigning homework to the pupils (Massialas and Jarrar, 1983). Al-Sada (1992), who investigated science teaching methods in Qatari schools, provides a similar view.

These writers' main point is that pupils in such classrooms assumed an inactive role (listening, taking notes, seatwork), while the teachers were doing almost everything (explanation, demonstration, assessment). The present empirical findings offer very strong support to this argument. For example, it was found that the majority of science teachers in Qatari primary schools (both male and female) use lecturing as their main method of teaching (see Table 7.2). Moreover, pupil participation is very limited, and occurs only when pupils answer questions or read from textbooks. This suggests that, although the science curriculum for the primary stage is designed to be taught by discovery learning which requires pupils to investigate, test and carry out experiments by themselves or in small groups, most teachers did not respond in the innovative and experimental way curriculum developers assumed they would.

Another finding relating to the traditional teaching method (lecturing) was that such a method focuses on rote memory and recitation, while ignoring critical thinking and the relating of knowledge to real life (see Table 7.5). This finding is consistent with those of previous studies (Al-Nuri, 1950; Al-Kobisi, 1979), which suggested that an emphasis on rote memory and lecturing is rooted in Qatari society, as well as in traditional and religious teaching is Islamic societies (Tibawi, 1972; Husain and Ashraf, 1979). One teacher wrote in his diary:

> There is a real problem with existing teaching methods as they are traditional methods which do not increase creativity, develop mental ability, and link information to real life. This practice is similar to the common method of teaching by 'Kutabs' in the old days in Qatar. (HA, p. 1, ll. 3–7)

The findings of the present study not only support those of previous studies, but also indicate the reasons cited by teachers to justify their use of traditional teaching methods. In particular, teachers made the following points (see Table 8.2):

1. There is a shortage of adequate resources available to teachers.

2. There is a shortage of adequate pre- and in-service training programmes via which teachers can improve their praxis. This means that teachers continue to adopt traditional teaching methods.

3. The overloading of the syllabus obliges teachers to adopt lecturing as a teaching method.

4. Examinations in schools mainly focus on measuring pupils' capacity for memorising information.

5. Pupils are used to memorising information in all subjects at all stages.

6. There is a lack of co-operation between administrators and teachers in developing and improving teaching methods.

7. Overcrowded classrooms make lecturing the best method for teaching and controlling pupils.

These points are important in that they draw attention to a number of issues which need to be taken into account when improving the practice of teaching in Qatari schools.

Teachers were also able to suggest some useful strategies for improving existing teaching methods (see Table 8.3). They agreed that providing sufficient tools and equipment is very important. Reducing the number of pupils in each classroom is important in order to foster more creative and effective teaching; also, adequate in-service training should be provided so that teachers can employ effective teaching methods in their classrooms. Although these suggestions should be treated as important because of the evidence obtained from the analysis, further guidelines are necessary for improving teaching methods in Qatari schools.

In the light of these findings, it may be argued that replacing the lecturing method completely would be very difficult, for at least two reasons. First, this method is rooted in the Arabic and Islamic cultures, as well as in Qatari culture. Secondly, there are many technical, administrative, behavioural and resource-related problems which hinder the use of any one effective teaching technique (whether problem-solving, discovery learning, or co-operative learning) as the main method of instruction. It was evident from the interview data that, although teachers regarded their teaching methods as traditional ones, some of them insisted on continuing to use the same method. One of the teachers said the following:

> ... I think that the method I am using at present is the best technique in the present circumstances ... and it suits the reality of the situation in schools. (SA, 24.9.95, p. 2, ll. 16–18)

On the other hand, most teachers expressed a desire to use both the new teaching method and the traditional one. The data presented earlier make the point that teachers are aware not only of the limitations of their teaching method, but also that different teaching methods operate most effectively in different environments. In this context, Olson (1992) suggests the following:

> Without knowledge of past practice in particular cases, we have no way of understanding what might happen in the future if people were to try to change their teaching approach. Cases tell us about why people do what they do and why they persist in doing it. (p. 71)

As indicated earlier, teachers in Qatar know what they are doing and why they continue doing it. Therefore it can be argued that any attempt to improve the teaching practice should start from what teachers know and are familiar with, since improving practice is a complex process involving cultural, technical and behavioural elements. Olson (1992) makes this point as follows:

> Changing practice isn't merely a technical process – it involves considering what the change signifies. That entails dialogue – a conversation between the old and the new ... Change involves values as well as technical issues. It isn't sufficient to be au courant with the least scientific theories underlying the change ideas, to be the change agent or

> expert; values inherent in the old and the new practices are at issue. The old is not to be discarded out of hand. (p. 78)

Through such dialogue between practitioners and innovators the significance of innovation can be established. In the present study, teachers, through the questionnaires, interviews and diaries, stressed that lectures provide a valuable means by which they can present information, offer explanations, cope with the excessive content of the syllabus, increase pupil achievement and manage overcrowded classrooms (see Tables 7.4, 8.2). On the other hand, teachers agreed that co-operative learning is a valuable means for developing social skills, enhancing self-esteem and improving relationships among pupils (see Tables 7.7, 8.8, 9.2). It can be argued that the practitioners' contribution to the innovation is extremely important in order to ensure it is developed in a realistic and practical way. For example, in the present study teachers made four major points which might serve as a basis for improving science teaching in Qatari schools:

1. They admitted that their existing teaching methods have certain limitations, and they regarded improving their practice as highly important.

2. They believed that both lecturing and co-operative learning have advantages and limitations. Therefore, they suggested, both of them should be used, in different situations.

3. They agreed that stimulating the role of pupils in the learning process is one of the main advantages of co-operative learning.

4. They stressed that any innovation or attempt at improvement should consider carefully the limitations of Qatari schools, such as lack of resources, overcrowded classrooms and condensed syllabuses.

The need now is for a model which takes into account the above points in order to develop a realistic and practical alternative for improving science teaching in Qatari schools. This point is discussed in more detail in Chapter 12.

Chapter 12

Conclusions and Implications of the Study

12.1 Introduction

The aim of this study has been to explore the feasibility and effectiveness of co-operative learning methods in science teaching in Qatari primary schools. These methods have up until now never been adopted in Qatari primary schools in connection with any subject area. It is hoped, then, that the findings of this study will contribute towards improving educational practice in Qatari primary schools. Moreover, they may be of importance for all the Arab Gulf States, since there are great similarities between these states in terms of the problems science teachers encounter. This chapter presents some conclusions and discusses some of the implications which arise from the background, literature review, analysis and discussion chapters. It also focuses on some of the many questions which remain as yet unanswered but which, as a result of this study, may be seen as deserving further attention.

12.2 Implications for teaching methods

One possible conclusion that may be drawn from this study is that, under present circumstances, implementing co-operative learning on a large scale is very difficult, for at least two reasons. First, the lecturing method is deeply rooted in the Arabic and Islamic cultures. Secondly, there are many technical, administrative, behavioural and resource-related problems which hinder the use of *any* effective teaching technique

(whether problem-solving, discovery learning or co-operative learning) as the main method of instruction. It is evident from the interview data that, although teachers were aware of the drawbacks of their traditional teaching methods, some of them insisted on continuing to use these same methods. One of the teachers, for example, said:

> ... I think that the method I am using at present is the best technique in the present circumstances ... and it suits the reality of the situation in schools. (SA, 24.9.95, p. 2, ll. 16–18)

The question for teachers, then, is, given the present climate, how can they themselves adopt a realistic teaching method that both increases pupils' input into the learning process and allows for the limitations of the existing education system?

Teachers may recognise the problems inherent in their existing teaching practices; moreover, they are often able to identify reasons for such problems. They are, however, less frequently able to recognise how these problems can be overcome. This was evident when teachers were asked to provide strategies for improving their existing teaching methods. They focused on technical and administrative strategies (providing additional resources and increasing co-operation between school administrators and teachers) rather than on practical solutions which could be implemented at the classroom level and within schools' present limitations.

In this context, the researcher believes that progress can be made within the existing framework. The model shown in Figure 12.1 has been developed as a possible means of incorporating elements of co-operative learning into existing teaching methods. The

model is based on harnessing the positive elements of co-operative learning and traditional teaching methods. Its purpose is to help teachers:

- actively involve pupils in the learning process
- cope practically with resource-related difficulties
- increase pupil–pupil and pupil–teacher interaction

The model takes the form of a closed circle: it starts with teacher-directed large-group instruction and ends with the same stage. To illustrate: the first box is concerned with large-group instruction. This stage can involve a review of the previous day's work, with some information being retaught if necessary. Teachers can plan this stage around a series of questions that the previous lessons answered. Pupils should be given the chance to answer the questions individually or discuss them in pairs. This would provide a high degree of academic engagement for pupils. The second stage is the presentation of new content and skills. This stage helps teachers to ensure that all important content and skills are covered within the time available. The next stage is face-to-face practice. Teachers should plan a series of questions and activities and ask pupils to discuss and complete them in pairs. The aim here is to ensure that pupils are actively thinking about the content being presented. Also, this will help pupils learn from each other and improve their relationship with one another. The teacher's role here is to guide the pupils, check they are understanding the material, provide feedback, and teach material again if necessary. The fourth stage consists of assessing the extent to which pupils have learned the material. This can be done by getting the pupils to complete an individual exercise to ensure that all the pupils have learned the assigned tasks. The completion of the job is large-group instruction, in which the teacher summarises what the pupils should have learned from the lesson.

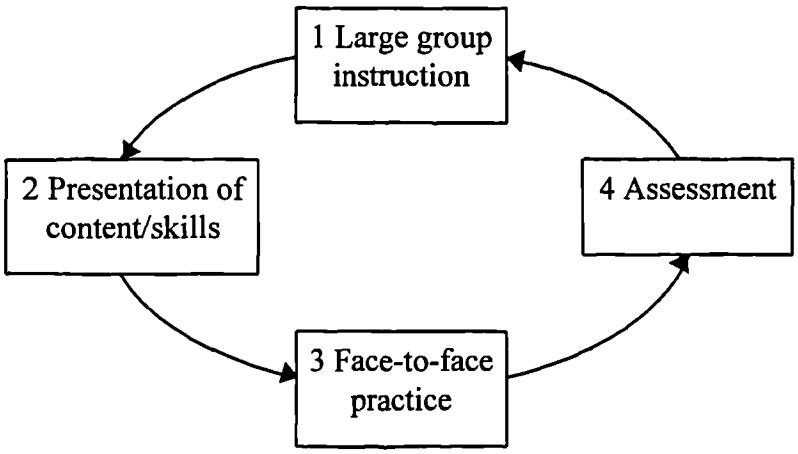


Figure 12.1 A proposed model for teaching science in the classroom

The model has a great deal of flexibility built in, so that different interactive methods of instruction can be used within the same framework. For example, at the third stage problem-solving can be used, in which each pair of pupils is given a problem to solve within a limited time. Pupils should share answers with their partners and create a new answer that they agree upon. Moreover, the model does not require a special room arrangement or any additional resources. In order to use the model effectively in the classroom, however, teachers should:

1. Carefully plan questions which require pupils to use higher thinking skills and share ideas with others.

2. Carefully plan the time available for teaching so that they complete the syllabus in the available time.

3. Prepare in advance the lesson or the experiment plan, including the tasks and activities in which the pupils will be engaged.

12.3 Implications for professional in-service education

Although examining the effectiveness of in-service education for teachers in Qatar was beyond the scope of this study, it was found that teachers were not satisfied with the quantity and quality of this. Teachers complained in their diaries about the lack of

suitable in-service education, and regarded this as one of their main reasons for continuing to use traditional teaching methods (see Table 8.2). On the other hand, they expressed great pleasure and satisfaction in participating in the training programme for this study. They reported a number of benefits, which included having the opportunity to discuss ideas and problems and to exchange experiences freely with fellow teachers. Also, using the experiential learning approach as the main method of instruction allowed teachers to be active learners throughout the training programme. In view of this and of the findings presented in Chapters 8 and 12, the model shown in Figure 12.2 was developed as a possible means for improving the effectiveness of any training programme. The first stage in developing an interactive training programme is to establish the training structure, which includes programme objectives, content planning, and method of instruction. While the objectives are pre-set, structure, content and planning are flexible and depend on the participants and the process within the learning environment. For example, during the training programme undertaken in this study, teachers suggested that they needed more sessions for planning and teaching lessons so as to improve their planning and teaching skills. As a result, arrangements were made to expand the time devoted to planning and giving microteaching lessons. Evaluation of the programme, in terms of content, preparation, duration, and advantages and difficulties encountered, is an ongoing process within the workshop.

The second stage consists of designing the tasks and the activities to promote experiential learning, so as to give the participants the opportunity to learn by experiencing – and to give them, moreover, the chance to express their thoughts

freely. Experiential learning can be promoted by role playing, group process, participant interaction, participant–instructor interaction and interdependence. It was evident during the training programme for the present study that teachers were very supportive, and contributed positively to the group process. They welcomed the opportunity to meet new colleagues, share ideas and take an active role in the learning process. Experiential learning should, then, be an integral part of any training programme.

The third stage in the model is concerned with the range of instructional methods which can be used to implement the training programme. These methods may include small- or large-group discussion using brainstorming and problem-solving, lecturing (in order to cover materials the instructor feels are difficult to understand), and presentation, to cover mini-topics in the workshop training. The findings of the present study suggest that teachers liked small- or large-group discussion, in which they could contribute more than they could via lecturing and presentations.

Finally, it should be stressed that participant evaluation is extremely useful at all stages of the model in order to improve the training programme. Participants' questions, comments, responses and criticisms such as occur during the training workshops all give the provider of training the opportunity to improve the quality of the training programme. Participant evaluation can take different formats, oral or written, qualitative or quantitative. It was evident in the present study that when teachers were given the chance to evaluate the training programme they were able to

provide valuable suggestions, comments and criticisms, which highlighted both the strengths and the weaknesses of the training programme.

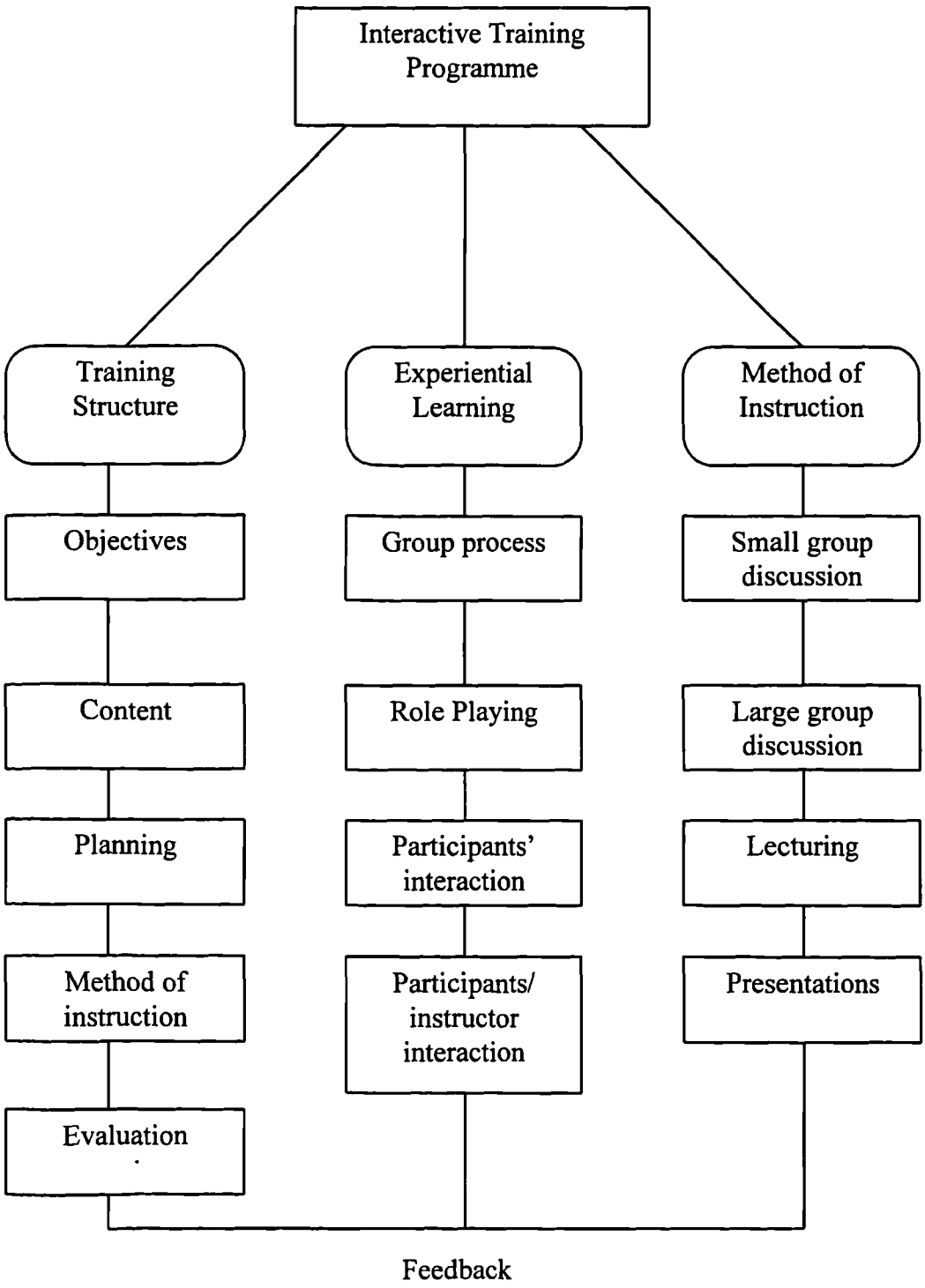


Figure 12.2 A proposed model for training teachers to use co-operative learning in the classroom

It has been claimed (Al-Atari, 1989; UNESCO, 1990) that a large number of Qatari teachers, especially in primary schools, are not well qualified. They therefore cannot assume all the responsibilities they are expected to. Nevertheless, it was evident in the present study that after a relatively short course of training teachers were able to implement carefully planned lessons based on specific principles and guidelines. Our interviews after the implementation of co-operative learning in classrooms showed that teachers were fully ready to implement co-operative learning. They seemed to be aware of all the basic elements of this method, such as lesson planning, the roles of pupils and teachers, classroom management, and the assessment of pupils. This suggests that it is possible to improve the quality of teachers through an appropriate in-service training programme. Such a programme could benefit from the interactive model put forward here for training teachers, although the value of the model would be increased if the number of teachers involved in the training programme were larger. If, then, educational practice in Qatar is to be improved, teachers should have access to appropriate training programmes and be kept up to date with new developments in the field of teaching.

12.4 Implications for teachers

It is recognised that in any educational reform or improvement, teachers are the focus of attention. It is their knowledge, skills, perceptions and character which determine the effectiveness and success of any educational reform at classroom level. However, teachers in Qatar are not given any role in educational reform or development in schools. The only role they assume in schools is teaching a pre-structured curriculum without the right to modify or change anything. Moreover, in comparison with other

professions in Qatar, teachers are not accorded high social status, nor do they enjoy a positive image in society. However, they are not themselves taking any action to change and improve their status. It seems that they are waiting for somebody to improve their situation, or maybe they are satisfied with their situation, or, more likely, they do not know what to do or how to set about it. Interestingly, in Qatar there are no formal associations for teachers in which they can promote their professional development by meeting colleagues, learning new ideas, discussing problems and concerns and working together towards improving the role and status of teachers in schools and in society. Such an association should aim to:

1. Provide the assistance, support and encouragement each member needs to gain a high degree of expertise in teaching pupils and managing classrooms.

2. Serve as a formal base for discussing problems and concerns connected with teaching methods, classroom management, school activities and classroom research.

3. Serve as a base for experienced teachers to share ideas with new teachers and teach them how to structure and manage classrooms successfully.

4. Serve as a base for extending teachers' influence beyond the province of schools – for example, gaining access to the media (television, radio and newspapers) in order to inform society of the latest developments and trends in education and to raise parents' awareness and call for their co-operation.

5. Create a setting in which gains and success are shared and celebrated.

There is, however, another implication for teachers of the present findings. As was suggested in Chapter 4, the communication and interaction that takes place between pupils and teachers is really at the heart of the educational process. Unfortunately, this conception of teacher–pupil relationships hardly exists in Qatari schools. Two reasons may be suggested for this: first, that teachers are using traditional teaching methods

(teacher-centred) which limit pupil participation and teacher–pupil interaction; and secondly, that the nature of the relationship between adults and children in Qatari society generally serves to encourage distance in the relationships between teachers and pupils. Therefore teachers should be urged to use co-operative learning in their classrooms in order to provide more opportunities for pupils to participate and take an active part in the learning process. But before that occurs, pupils need to be made aware of why they are asked to work with other children in small groups. Pupils should be taught how to work co-operatively with other children in small groups, and teachers should gradually work towards breaking down the psychological barrier that exists between them and pupils.

12.5 Implications for policy-making and curriculum innovation

Chapters 3 and 8 noted the very poor level of success that has been achieved over the last four years in the classroom implementation of apparently innovative science curricula for the primary stage. It was suggested that curriculum innovators did not examine the quality of teachers in schools in the Gulf States, nor did they take into account what is already being done well in classrooms before planning the curricula so that their planning might be more realistic and gain acceptance from teachers. Very often, the successful adoption of curriculum innovation in the classroom is highly affected by teachers' perceptions of its practicality.

The primary school science curriculum in Qatar is imposed on teachers. Teachers are not involved in any stage of the curriculum development process except in the pilot stage. They do not even receive adequate training to implement curriculum innovation

successfully in classrooms. Brown and McIntyre (1993), realising the importance of the teacher in the implementation of any curriculum innovation, state the following:

> As educators, teachers frequently recognise the merits of proposed innovations; and, while politicians and managers of education systems have the power to offer rewards and to impose sanctions to encourage teachers to innovate, it is the teachers themselves who ultimately decide whether or not any innovation will be implemented in classrooms. (p. 117)

Our own findings suggested that teachers were not enthusiastic about implementing the SCPS in the desired way. They claimed that the curriculum puts heavy pressure on them to accomplish the desired objectives, while failing to take into account the fact that classrooms are overcrowded. The time allocated for teaching is insufficient and laboratories are not well equipped. Therefore teachers working at different levels in schools should be involved in curriculum innovation. This would help curriculum innovators to produce a practical curriculum, and help teachers to accept it. However, the data obtained in this study do not address the question of how teachers in Qatar might contribute towards and participate in curricula planning. Are teachers in Qatar capable, in terms of skills and knowledge, of taking an active part in the planning process? Are the authorities at the Ministry of Education in Qatar aware of the importance of teachers in planning and implementing innovations? There is a need for research which will look in detail at these questions, with particular reference to science curricula.

12.6 Resources and curriculum materials

Provision of adequate resources seems to be a problem in education worldwide. The empirical findings (both quantitative and qualitative) showed that teachers in Qatar expressed great concern about the lack of adequate resources and materials, which

hinder the use of co-operative learning in Qatari primary schools. This implies that co-operative learning cannot realistically be implemented on a large scale in Qatar. In the present circumstances, calls for additional resources to counter this problem will be futile. Neither school administrators nor the Department of Educational Aids will support calls for more tools, equipment and duplication of resources.

Schools in Qatar are often reluctant to provide adequate resources for all their educational programmes, because they are underfunded. This implies that teachers have to rely only on books, because they represent the only available approved resources. Over-reliance on books, however, would clearly limit children's learning, because children's ability to apply knowledge in real situations is not enhanced. Moreover, teachers are reluctant to adapt their traditional teaching methods (lecturing) in favour of interactive teaching methods (discovery learning, co-operative learning and problem-solving), since any attempts to innovate can easily be frustrated if the necessary resources are unavailable.

The question for teachers, then, is how can they themselves overcome this problem of resources? Unfortunately, the findings suggest that teachers in Qatar believe that contributing towards solving this problem is not their responsibility. They stressed that the Ministry of Education should be concerned with solving this dilemma. One reason which may be suggested for this passivity is that the education system in Qatar is highly centralised, in that teachers are only expected to carry out the instructions of the Ministry of Education. Another reason may be that teachers are not allowed to ask pupils or parents to help in providing any materials and resources for schools.

Matters such as this should, however, be of concern to teachers too, because it is their responsibility to ensure that the resources necessary for the introduction of what is planned are available. Moreover, they are responsible for helping learners to acquire knowledge and skills in a practical way. It is therefore important for teachers to bear in mind a number of questions concerning the use of resources:

1. What resources are available in schools, and what additional resources are needed?

2. How can the necessary resources be obtained? Should parents and pupils be involved in the provision of resources and materials? Should the private sector be involved in the provision of resources?

3. Does a variety of resources necessarily broaden children's experience?

4. Do children know how to approach resources judiciously, to make the best use of them?

Teachers should be given time to become involved in designing their own resources and materials. Programmes should be structured to give them time to develop new materials, reflect on their implications, and use them carefully in classrooms. It may be necessary to use time available when schools are not in session to design and develop materials.

12.7 Concluding remarks

This thesis has maintained that teachers in Qatari primary schools are able to implement co-operative learning on a small scale in their classrooms. The teachers who took part in this study agreed that co-operative learning gives them more important roles than do traditional teaching methods. Moreover, they suggested that co-operative learning increases pupils' participation and interaction, develops social skills and better relationships among pupils, and increases pupil achievement.

The findings of this study indicate also that pupils have a high degree of commitment to co-operative learning. Those observed were able to share ideas and materials and help each other to learn. Moreover, they enjoyed working in groups, and contributed verbally in the groups to complete the assigned materials. Furthermore, the findings of the achievement test revealed that the treatment group outperformed the control group in the post-achievement test. Taking these things as a whole, pupils in Qatari primary schools responded positively to co-operative learning. It should be stressed, however, that the sample size of the present study was limited. Therefore further research should be conducted involving a wider sample and investigating other variables such as sex, nationality and age.

Present circumstances present a number of obstacles to the wholesale introduction of co-operative learning. These range from technical, administrative, behavioural and resource-related problems through to deep-seated cultural attitudes. Nevertheless, it has been argued that progress can be made within the existing framework. Teachers can incorporate elements of co-operative learning into their classroom in order to increase pupil participation and interaction, improve achievement, and enhance relationships among pupils. In this context, the model shown in Figure 12.1 has been developed as a possible means of incorporating elements of co-operative learning into the existing school framework. It is hoped, then, that the findings and recommendations of this study will contribute towards improving educational practice, especially teaching methods in Qatari primary schools.

BIBLIOGRAPHY

Aba-bna, A. (1995). The effects of two co-operative learning approaches on attitudes of seventh grade basic education students (in Jordan) toward the learning of mathematics. The ERC Journal, 4, (8), 37–57.

Abu-Galalah, F. A. (1993). The cultural dimension of teaching English as a foreign language in an Arab Gulf state. Unpublished Ph.D thesis, University of Durham.

Abu-Huwage, T. A. (ed.) (1990). Fifth Grade Science Curriculum: Teacher's Handbook. Doha: Gulf Establishment for Publications and Press.

Abu-Zahrah, M. (1967). The Human Society in the Shadow of Islam. Egypt: Dar Al-Iklas Press.

Al-Ahmad, A. (1986). The Development of General Education System in the State of Kuwait. Kuwait Foundation for the Advancement of Science.

Al-Atari, A. T. M. (1989). Role perceptions and role performance of instructional supervisors as perceived by teachers and supervisors in the public schools of Qatar: An exploratory study. Unpublished Ph.D thesis, University of Durham.

Al-Dirainy, H. A. (1987). My preferred style of learning. Bulletin of the Faculty of Education, University of Qatar, 5 (5), 363-95.

Al-Dusuqi, F. (1986). The Pillars of the Muslim Society. Beirut: The Islamic Office.

Al-Faleh, N. A. (1981). Effect of lecture-demonstration and small group experimentation teaching methods on Saudi Arabian students' Chemistry achievement and attitudes towards science learning. Unpublished Ph.D dissertation, Indiana University.

Al-Hafidh, N. (1973) Qatar Educational Profile. Beirut: UNESCO Regional Office for Education in the Arab Countries.

Al-Hamadi, A. M. (1984). An approach for teacher participation in curriculum planning in the state of Qatar. Unpublished EDD dissertation, State University of New York at Buffalo.

Ali, A. Y. (1938). The Holy Qur'an: Text, Translation and Commentary. Doha: Publications of Presidency of Islamic Courts and Affairs, State of Qatar.

Al-Ibrahim, A. (1980). Toward a conceptual model for curriculum development, the case of Qatar. Unpublished EDD dissertation, State University of New York at Buffalo.

Al-Jalal, A. A. (1984). The Arab Teacher: The Standard of Teachers' Education and the Social Status of the Teaching Profession. A paper presented at a symposium on teacher education in the Arab Gulf States, held in Qatar University.

Al-Jalal, A. A. (1986). The Education of Facilitation and the Retardation of Development: An Introduction to the Study of Educational System in Arab Oil Producing Island States. Qatar: Periodic Council of Culture, Arts and Literature.

Al-Kobaisi, A. J. (1979). The development of education in Qatar, 1950–1977 with an analysis of some educational problems. Unpublished Ph.D thesis, University of Durham.

Al-Kurdi, M. F., Mujahid, H. M., and Al-Isa, J. (1985). Doha: The State City: Fieldwork Study for the Urbanisation Pattern in Doha. Doha: Al-Ahleia, P. Press.

Al-Misnad, S. A. (1984) The development of modern education in Bahrain, Kuwait and Qatar: with special reference to the education of women and their position in modern Gulf society. Unpublished Ph.D Thesis, University of Durham.

Al-Nuri, A. M. (1950). The Story of Education in Kuwait in the Half Century (1300–1360). Cairo. [n.pub.]

Al-Sada, S. (1992). The improving of science teaching methods for the preparatory stage in the state of Qatar. Unpublished M.A. dissertation, The First University of Tunisia.

Al-Subai, M. (1979). Our Social Morals. (4th ed.). Beirut: The Islamic Office.

Al-Tamimi, A., and Samrin, B. A. (1985). Views of Islamic Education. Amman: Dar-Albashier.

Anderson, L. W., and Burns, R. B. (1989). Research in Classrooms: The Study of Teachers, Teaching and Instruction. Oxford: Pergamon Press.

An-nawawi, A. Y. (1989). Riyadh-Us-Saleheen, Vol. 2. New Delhi: Idara Isha'at-E-Diniyat.

Aronson, E., Blaney, N., Stephan, C., Sikes, U., and Snapp, M. (1978). The Jig-Saw Classroom. Beverly Hills, CA: Sage.

Bawazeer, A. S. (1979). Curriculum renewal for the Saudi Arabian secondary school. Unpublished Ph.D dissertation, University of Columbia.

Beck, S. E. (1992). The development, analysis, implementation and evaluation of a co-operative learning teaching model using action research in RN/BSN nursing. Unpublished EDD dissertation, Widener University.

Bellon, J. J., Bellon, E. C., and Blank, M. N. (1992). Teaching from Research Knowledge Base: A Development and Renewal Process. New York: Macmillan.

Bennett, N. C. (1994). Co-operative Learning. In P. Kutnick and C. Rogers (eds). Groups in Schools. London: Cassell.

Bennett, N., and Cass, A. (1988). The effects of group composition on group interactive processes and pupil understanding. British Educational Research Journal, 15, 19-32.

Bennett, N., and Dunne, E. (1990). Implementing Co-operative Groupwork in Classrooms. In V. Lee (ed.). Children's Learning in School. London: Hodder & Stoughton.

Bennett, N., and Dunne, E. (1992). Managing Classroom Groups. London: Simon & Schuster.

Bennett, N., Desforges, C., Cockburn, A., and Wilkinson, B. (1984). The Quality of Pupils' Learning Experiences. London: Lawrence Erlbaum Associates.

Berkey, J. (1992). The Transmission of Knowledge in Medieval Cairo: A Social History of Islamic Education. Princeton, NJ: Princeton University Press.

Bloom, B. S. (1972). Innocence in education. School Review, 80, 332–52.

Bobbitt, F. (1918). The Curriculum. Boston: Houghton Mifflin.

Bogdan, R. C., and Biklen, S. K. (1992). Qualitative Research for Education: an Introduction to Theory and Method. Needham Heights, MA: Allyn & Bacon.

Borg, W. R. (1987). Applying Educational Research: A Practical Guide for Teachers. (2nd ed.). London: Longman.

Boydell, D. (1975). Pupils' behaviour in junior classrooms. British Journal of Educational Psychology, 45, 122-9.

Brown, S., and McIntyre, D. (1993). Making Sense of Teaching. Buckingham: Open University Press.

Bruner, J. S. (1959). The Process of Education. Cambridge, MA: Harvard University Press.

Bruner, J., and Haste, H. (1987) Making Sense. London: Methuen.

Bulmer, M., and Warwick, D. P. (1993). Social Research in Developing Countries: Surveys and Censuses in the Third World. London: UCL Press.

CACE (Central Advisory Council for Education) (1967). Children and Their Primary Schools (the Plowden Report). London: HMSO.

Cohen, E. G. (1986). Designing Groupwork: Strategies for the Heterogeneous Classroom. New York: Teacher College, Columbia University.

Cohen, E. G. (1992). Restructing the Classroom: Conditions for productive small groups. Paper prepared at the Centre on Organisation and Restructuring of Schools, Madison, WI (ERIC document reproduction service No. ED. 347–639).

Cohen, L. and Manion, L. (1989). Research Methods in Education, 3rd ed. London: Routledge.

Cohen, L. and Manion, L. (1993). A Guide to Teaching Practice. (3rd ed.). London: Routledge.

Cohen, L. and Manion, L. (1994). Research Methods in Education. (4th ed.). London: Routledge.

Cotton, J. and Cook, M. (1982). Meta-analysis and the effects of various systems: some different conclusions from Johnson *et al.* Psychological Bulletin, 92, 176–83.

Davidson, N. (1980). Small-Group Learning and Teaching in Mathematics: An Introduction for Non-Mathematicians. In S. Sharan, P. Hare, C. D. Webb, and R. Hertz-Lazarowitz, (eds.). Cooperation in Education (pp. 136–45). Provo, UT: Brigham Young University Press.

DES (Department of Education and Science) (1988). Science for Ages 5 to 16. London: National Curriculum Council.

Deutsch, M. (1949). A theory of co-operation and competition. Human Relations, 2, 129-52.

De Vaus, D. A. (1991). Surveys in Social Research. London: Allen & Unwin.

De Vries, D. L., and Slavin, R. E. (1978). Teams - Games - Tournaments (TGT). Review of the classroom experiments. Journal of Research and Development in Education, 12, 28–38.

Dewey, J. (1944). Democracy and Education. New York: The Free Press.

Doran, M. (1980). Co-operation between Teacher Education and the School: The Birth of the City College Open-Corridor Advisory Service. In S. Sharan, P. Hare, C. D. Webb, and R. Hertz-Lazarowitz, (eds.). Cooperation in Education. Provo, UT: Brigham Young University Press.

Dumati, F. I. (1992). The effects of using small groups on achievement and retention in social studies for female students at the colleges of education in Madena Al-Munawwara. Educational Journal, 25, 95–124.

Dunham, J. (1992). Stress in Teaching, (2nd ed.). London: Routledge.

Dunne, E., and Bennett, N. (1990). Talking and Learning in Groups. London: Macmillan.

Dwivedi, K. N. (1993). Groupwork with Children and Adolescents: A Handbook. London: Jessica Kingsley.

Eickelman, D. S. (1976). Moroccan Islam. Austin: University of Texas Press.

El-Koussy, A. A. (1967). Recent trends and development in primary and secondary education in the Arab world. International Review of Education, 13, 198–210.

Elliott, J. (1991). Action Research for Educational Change. Milton Keynes: Open University Press.

Ellis, H. L. (1988). The Effects of Co-operative Learning on Achievement: A Meta-Analysis. EDD dissertation University of Georgia.

Ellis, S. S. (1989–90). Introducing co-operative learning. Educational Leadership, 47 (7), 34–7.

Ellis, S. S., and Whalen, S. F. (1992). Keys to co-operative learning. Instructor, February, 34–7.

Galton, M. (1981). Teaching groups in the junior school: A neglected art. School Organisation, 1 (2), 175–81.

Galton, M., and Williamson, J. (1992). Groupwork in the Primary School. London: Routledge.

Galton, M., Simon, B., and Croll, P. (1980). Inside the Primary School. London: Routledge.

Galvin, P., Mereer, S., and Costa, P. (1994). Building a Better Behaved School. London: Longman.

Gay, L. R. (1992). Educational Research Competencies for Analysis and Application (4th ed.). New York: Macmillan.

Gayford, C. (1993). Discussion-based groupwork related to achievement issues in science classes with 15-year-old pupils in England. International Journal of Science Education, 15 (5), 521–29.

Ghannam, A. M. (1984). Reconstruction of Educational Administration: a New Strategy in the Arab World: New Contemporary Trends of Educational Leadership. Riyadh: Arab Bureau of Education Publications.

Giles, H. H., McCutchen, S. P., and Zechiel, A. N. (1942). Exploring the Curriculum. New York: Harper.

Goitein, S. D. (1971). A Mediterranean Society. Berkeley and Los Angeles: University of California Press.

Good, T. L., Rey, B. J., Grouws, D. A., and Mulryan, C. M. (1989–90). Using workgroups in mathematics instruction. Educational leadership, 47 (4), 56–62.

Gronlund, N. E. (1976). Measurement and Evaluation in Teaching. New York: Macmillan.

Gülen, M. F. (1993). Questions This Modern Age Puts to Islam. London: Truestar.

Hajaj, A., and Al-Sheikh, A. (1984). Evaluation Study of Preparatory/Secondary School Teacher Education Programmes at Qatar University. Educational Research Centre, Qatar University.

Hall, K. (1995). Learning modes: an investigation of perceptions in five Kent classrooms. Educational Research, 37 (1), 21–32.

Hamed, A. M. (1993). Islamic religion in Qatar during the twentieth century: Personnel and institutions. Unpublished Ph.D thesis, University of Manchester.

Hameed, J. (1981) A Study of Selected Behaviour of Female School Teachers in Educational Situations and Its Relation to Experience, Educational Qualifications, Principals' and Counsellors' Education. Educational Research Centre, Qatar University.

Hanna, G. S. (1993). Better Teaching Through Better Measurement. Florida: Harcourt Jovanovich.

Hawley, W. D., and Rosenholtz, S. J. (1984). Good schools: what research says about improving student achievement. Peabody Journal of Education, 61 (4), 15–52.

Hayon, L., and Beretz, M. (1986). Becoming a teacher: the transition from teachers' colleges to classroom life. Instructional Review of Education, 32, p. 414.

Heinich, R., Malenda, M., and Russell, J. D. (1993). Instructional Media and the New Technologies of Instruction, (4th ed.). New York: Macmillan.

Hirst, D. H. (1968). The Contribution of Philosophy to the Study of the Curriculum. In J. F. Kerr (ed.). Changing the Curriculum. London: University of London Press.

HMI (1982). Education 5–9: An Illustrative Survey of 80 First Schools in England. London: HMSO.

HMI (1989a). Aspects of Primary Education: The Teaching of Mathematics. London: HMSO.

HMI (1989b). Aspects of Primary Education: The Teaching of Science. London: HMSO.

Hofmann, M. (1993). Islam : the Alternative. Reading: Garnet Publishing.

Holubec, E. (1992). How do you get there from here? Getting started with co-operative learning. Contemporary Education, 63, (3), 181–4.

Hook, C. (1985). Studying Classrooms. Geelong, Victoria: Deakin University Press.

Hopkins, D. (1993). A Teacher's Guide to Classroom Research. (2nd ed.). Milton Keynes: Open University Press.

Husain, S. S., and Ashraf, S. A. (1979). Crisis in Muslim Education. Sevenoaks: Houghton & Stoughton.

Johnson, D. W., and Johnson, F. P. (1975). Joining Together: Group Therapy and Group Skills. Englewood Cliffs, NJ: Prentice Hall.

Johnson, D. W., and Johnson, F. P. (1991). Joining Together: Group Therapy and Group Skills, 4th ed. Englewood Cliffs, NJ: Prentice Hall.

Johnson, D. W., and Johnson, R. T. (1983). Social interdependence and perceived academic and personal support in the classroom. Journal of Social Psychology, 120, 77–82.

Johnson, D. W., and Johnson, R. T. (1985). The Internal Dynamics of Co-operative Learning Groups. In R. E. Slavin (ed.). Learning to Co-operate, Co-operating to Learn. New York: Plenum.

Johnson, D. W., and Johnson, R. T. (1987). Learning Together and Alone: Co-operation, Competition and Individualisation, (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Johnson, D. W., and Johnson, R. T. (1989-90). Social skills for successful groupwork. Educational Leadership, 47 (4), 29–33.

Johnson, D. W., and Johnson, R. T. (1992). Implementing co-operative learning. Contemporary Education, 63 (3), 137–80.

Johnson, D. W., Johnson, R. T., and Holubec, E. (1986). Circles of Learning: Co-operation in the Classroom. Edina, MN: Interaction Book Company.

Johnson, D. W., Johnson, R. T., and Holubec, E. (1987). Structuring Co-operative Learning: The Handbook of Lessons Plans for Teachers. Edina, MN: Interaction Book Company.

Johnson, D. W., Johnson, R. T., and Holubec, E. (1991). Co-operation in the Classroom. Edina, MN: Interaction Book Company.

Johnson, D. W., Johnson, R., Johnson, J., and Anderson, D. (1976). The effects of co-operative vs. individualised instruction on student prosocial behaviour, attitudes toward learning, and achievement. Journal of Educational Psychology, 68, 446–52.

Johnson, D. W., Johnson, R. T., Roy, P., and Zaidman, B. (1985). Oral interaction in co-operative learning group: speaking, listening and the nature of statements made by high- medium- and low-achieving students. Journal of Psychology, 119, 303–21.

Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., and Skon, L. (1981). Effects of co-operative, competitive and individualistic goal structures on achievement: a meta-analysis. Psychological Bulletin, 89, 47–62.

Kadri, Y. (1986). Educational aims and policies of teachers in Arab countries with special political options: A problem solving approach. Unpublished Ph.D Thesis, University of Durham.

Kagan, S. (1989-90). The structured approach to co-operative learning. Educational Leadership, 47 (4), 12–15.

Kagan, S. (1994). Co-operative Learning. San Juan Capistrano, CA: Resources for Teachers, Inc.

Kamal, A. A. A. (1990). An experimental study comparing the effect of multiple teaching methodologies and traditional methodologies on student achievement and attitudes in history classes for secondary girls in Qatar. Unpublished Ph.D Thesis, University of Durham.

Kamii, C., and De Vries, R. (1988). Group Games in Early Education: Implication of Piaget's Theory. Washington DC: National Association for the Education of Young Children Publishing Co.

Kemmies, S., and McTaggart (1988). The Action Research Planner. (3rd ed.). Victoria: Deakin University Press.

Kerr, J. F. (1968). Changing the Curriculum. London: University of London Press.

Kerry, T., and Sands, M. (1982). Handling Classroom Groups. Nottingham: University of Nottingham School of Education/Basingstoke: Macmillan.

Khalil, I. (1991). Islamisation of Knowledge: A Methodology. Occasional Papers No. 2. Maryland: International Graphics.

King, H. (1993), High and low achievers perceptions and co-operative learning in two small groups. The Elementary School Journal, 93 (4), 399–416.

Kosters, A. E. (1990). The effects of co-operative learning in the traditional classroom on student achievement and attitude. Unpublished EDD dissertation, University of South Dakota.

Krug, E. (1957). Curriculum Planning. New York: Harper.

Kutnick, P. (1994). Use and Effectiveness of Groups in Classrooms: Towards a Pedagogy. In P. Kutnick and C. Rogers (eds.) Groups in Schools. London: Cassell.

Kutnick, P., and Rogers, C. (1994). Groups in Classrooms. In P. Kutnick and C. Rogers (eds.) Groups in Schools. London: Cassell.

McKernan, J. (1991). Curriculum Action Research: A Handbook of Methods and Resources for the Reflective Practitioner. London: Kogan Page.

McNeil, J. D. (1990). Curriculum: A Comprehensive Introduction. (4th ed.). Los Angeles: Harper Collins.

Madden, N. A., Slavin, R. E., and Stevens, R. J. (1986). Co-operative Integrated Reading and Composition: Teacher's Manual. Baltimore: John Hopkins University Centre for Research on Elementary and Middle Schools.

Mandel, S. (1991). Responses to Co-operative Learning Processes among Elementary-age Students. Paper presented at the Annual Conference of the American Educational Research Association, Chicago, IL, April. (ERIC document reproduction service No. ED. 332–808.)

Manning, M. L., and Lucking, R. (1991). The what, why, and how of co-operative learning. Educational Leadership, 47 (7), 34–7.

Massialas, B. G., and Jarrar, S. A. (1983). Education in the Arab World. New York: Praeger Publishers.

Medley, D. M., and Mitzel, H. E. (1963). Measuring Classroom Behaviour in Systematic Observation. In N. L. Gage (ed.). Handbook of Research on Teaching (pp. 247–328). Chicago: Rand-McNally.

Melikan, L. (1981). Jassim: A Study in Psychological Development of a Young Man in Qatar. London: Longman.

Merrett, F. (1994). Whole-class and Individualised Approaches. In P. Kutnick and C. Rogers (eds.) Groups in Schools. London: Cassell.

Merton, R. K., and Kendal, P. L. (1946). The focused interview. American Journal of Sociology, 51, 541–57.

Miles, M. B., and Huberman, M. A. (1984). Qualitative Data Analysis: A Sourcebook of New Methods. Beverly Hills and London: Sage.

Miles, M. B., and Huberman, M. A. (1994). Qualitative Data Analysis: An Expanded Sourcebook, (2nd ed.). Thousand Oaks, CA: Sage.

Ministry of Education (1985). Annual Report. Doha, Qatar: Ministry of Education Printing Press Department.

Ministry of Education (1986). Development of Education in Qatar in 1984–86. Doha, Qatar: Ministry of Education Printing Press Department.

Ministry of Education (1991–2). Development of Education in Qatar. Doha, Qatar: Ministry of Education Printing Press Department.

Ministry of Education (1992–3). Annual Report. Doha, Qatar: Ministry of Education Printing Press Department.

Morrison, K., and Ridley, K. (1988). Curriculum Planning and the Primary School. London: Paul Chapman.

Nachmias, D. and Nachmias, C. (1987). Research Methods in Social Science (3rd ed.). New York: St Martin's Press.

Nagi, K. (1980). Development of School Curricula in Qatar. Paper presented at the WCCI World Conference on Education.

Nakosteen, M. (1964). History of Islamic Origins of Western Education AD 800–1350, with an Introduction to Medieval Muslim Education. [n.pub.].

Newmann, F. M., and Thompson, J. (1987). Effects of Co-operative Learning on Achievement in Secondary Schools: A Summary of Research. Madison, Wisconsin.: University of Wisconsin, National Centre on Effective Secondary Schools.

Nouh, M. M. (1993). The effects of co-operative learning on the achievement of the 2nd year preparatory stage pupils' geometric skills. The Social Sciences Journal, 7, 131–63.

Norusis, M. J. (1992). SPSS/PC+: Base System User's Guide. Chicago: SPSS.

Ogawa, M. (1986). Towards a new rationale of science education in a non-western society. European Journal of Science Education, 8, 113–9.

Ollerenshaw, C., and Ritchie, R. (1993). Primary Science: Making it Work. London: David Fulton.

Olson, J. (1992). Understanding Teaching. Milton Keynes: Open University Press.

Ornstein, A. C., and Hunkins, F. P. (1988). Curriculum Foundations, Principles, and Issues. Boston: Allyn & Bacon.

Parker, R. E. (1985). Small-group co-operative learning – improving academic, social gains in the classroom. NASSP Bulletin, March, 48–57.

Pepitone, A. (1980). Children in Co-operation and Competition. Lexington, MA: Lexington Books.

Piaget, J. (1950). The Psychology of Intelligence. London: Broadway.

Qa'ud, I. (1995). The effect of co-operative learning and self concept. The ERC Journal, 4 (7), 131–72.

Reece, I. and Walker, S. (1994). A Practical Guide to Teaching, Training and Learning, (2nd ed.). Sunderland: Business Education Publishers.

Sarwar, G. (1987). Islam Beliefs and Teachings. The Muslim Educational Trust, Nottingham: Edwin, Packer & Johnson.

Saylor, J. G., Alexander, M. W., and Lowis, J. A. (1980). Curriculum Planning for Better Teaching and Learning, (4th ed.). New York: Holt, Rinehart & Winston.

Sawalha, M. (1990). The relationship between the self-esteem and the type of feedback of the efficiency of learning scientific concepts for the 2nd year at preparatory stage in Jordan. Unpublished Ph.D thesis, University of Ayn-Shams, Cairo.

Shachar, H., and Sharan, S. (1994). Talking, relating and achieving: effects of co-operative learning and whole-class instruction. Cognition and Instruction, 12 (4), 313–53.

Shafritz, J. M., Koeppe, R. P., and Soper, E. (1988). The Facts on File: Dictionary of Education. New York: Facts on File.

Sharan, S. (1980). Co-operative learning in small groups: recent methods and effects on achievement, attitudes and ethnic relations. Review of Educational Research, 50, 241–71.

Sharan, S., Hare, P., Webb, C. D., and Hertz-Lazarowitz, R. (eds.). (1980) Co-operation in Education . Provo, UT: Brigham Young University Press.

Sharan, S., and Hertz-Lazarowitz, R. (1980) A Group Investigation Method of Co-operative Learning in the Classroom. In S. Sharan, P. Hare, C. D. Webb, and R. Hertz-Lazarowitz, (eds.). Co-operation in Education (pp. 7–13). Provo, UT: Brigham Young University Press.

Sharan, S., and Sharan, Y. (1976). Small-Group Teaching. Englewood Cliffs, NJ: Educational Technology Publications.

Sharan, S., and Sharan, Y. (1987). Training teachers for co-operative learning. Educational Leadership, 45 (3), 20–5.

Sharan, Y., and Sharan, S. (1989–90). Group investigation expands co-operative learning. Educational leadership, 47 (4), 17–21.

Shiqeliya, M. J. (1992). Sixth Grade Science Curriculum: Teacher's Handbook. Doha: Gulf Establishment for Publications and Press.

Simon, M. A. (1986). The teachers' role in increasing student understanding of mathematics. Educational Leadership, 43 (7), 40–3.

Skilbeck, M. (1984). School-Based Curriculum Development. London: Harper and Row.

Slavin, R. E. (1978a). Student teams and achievement divisions. Journal of Research in Education 12, 39–49.

Slavin, R. E. (1978b). Students teams and comparison among equals: effects on academic performance and student attitudes. Journal of Educational Psychology, 70, 532–38.

Slavin, R. E. (1983). When does co-operative learning increase student achievement? Psychological Bulletin, 94, 429–45.

Slavin, R. E. (1984a). Students motivating students to excel: co-operation incentives, co-operative tasks and students' achievement. Elementary School Journal, 85, 53–63.

Slavin, R. E. (1984b). Research Methods in Education: A Practical Guide. Englewood Cliffs, NJ: Prentice Hall.

Slavin, R. E. (1987a). Co-operative learning and the co-operative school. Educational Leadership, 45, 7–13.

Slavin, R. E. (1987b). Co-operative Learning, (2nd ed.). Washington DC: National Education Association.

Slavin, R. E. (1989–90). Research on co-operative learning consensus and controversy. Educational Leadership, 47 (4), 52–4.

Slavin, R. E. (1990). Co-operative Learning: Theory, Research and Practice. Englewood Cliffs: Prentice Hall.

Slavin, R. E. (1991). Synthesis of research on co-operative learning. Educational Leadership, 48 (4), 80–1.

Slavin, R. E. (1993). Co-operative Learning and Achievement: An Empirically-Based Theory. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, April.

Slavin. R. E., Leavey, M. B., and Madden, N. A. (1984). Combining co-operative learning and individualized instruction: effects on student mathematics achievement, attitudes and behaviors. Elementary School Journal, 84, 409–22.

Slavin, R. E., Leavey, M. B., and Madden, N. A. (1986). Team Accelerated Instruction – Mathematics. Watertown, MA: Mastery Education Co-operation.

Slavin, R. E., and Oickle, E. (1981). Effects of co-operative learning teams on student achievement and race relations: treatment by race interactions. Sociology of Education, 54, 174–80.

Solomon, J. (1980). Teaching Children in the Laboratory. London: Croom Helm.

State of Qatar (1992). Annual Statistical Abstract. Doha, Qatar: Presidency of the Council of Ministers, Central Statistical Organisation.

Szyliowcz, J. (1973). Education and Modernity in the Middle East. London: Cornell University Press.

Taba, H. (1962). Curriculum Development: Theory and Practice. New York: Harcourt, Brace & World.

Thorndike, R. L., and Elizabeth, H. (1961). Measurement and Evaluation in Psychology and Education. (2nd ed.). New York: Wiley.

Mohammed *et al.* (1992). Fifth-Grade Science Curriculum: Teacher's Handbook. Doha, Qatar: Al-Ahleia Press.

Tibawi, A. L. (1972). Islamic Education: Its Traditions and Modernisation into the Arab National System. London: Luzac.

Tizard, B., Blatchford, P., Burke, H., Farquhar, C., and Plewis, I. (1988). Young Children at School in the Inner City. Hove: Lawrence Erbaum Associates.

Tolefat, S. A. (1983). Toward an integrative responsive model for education evaluation in Qatar. Unpublished EDD dissertation, State University of New York at Buffalo.

Turney, B. L., and Robb, G. P. (1971). Research in Education: An Introduction. Hinsdale: Dryden Press.

Tyler, R. W. (1949). Basic Principles of Curriculum and Instruction. Chicago: University of Chicago Press.

Tyler, R. (1983). Fundamental Curriculum Decisions, ASCD Year Book. Washington DC.

UNESCO (1990). Evaluating the Educational System in the State of Qatar. UNESCO Expert's Report. Doha: Dar Al-Olum Establishment Press.

Vygotsky, L. (1978). Mind and Society: The Development of Higher Mental Processes. Cambridge, MA: Harvard University Press.

Warwick, R. (1983). On Methodological Integration in Social Research. In M. Bulmer, and D. Warwick (eds.). Social Research in Developing Countries. Chichester: John Wiley.

Webb, N. (1989). Peer interaction and mathematics learning in small groups. Journal of Research in Mathematics Education, 22, 366–89.

Wheldall, K., Morris, M., Vaughan, P., and Yin Yuk No (1981). Rows vs. tables: an example of the use of behavioural ecology in two classes of 11-year-old children. Educational Psychology, 1, 171–83.

Wiersma, W. (1986). Research Methods in Education: An Introduction, (4th ed.). Newton, MA: Allyn & Bacon.

Wood, D. (1988). How Children Think and Learn. Oxford: Basil Blackwell.

Yeomans, A. (1983). Research report: collaborative group work in primary and secondary schools: Britain and USA. Durham and Newcastle Research Review, 10 (51, Autumn), 99–105.

Zioure, A. (1977). Psychological Analogy of the Arab Self: Types of Behaviour and Fiction. Beirut: Dar Al-Taleea.

Appendix 1

Authors of the Pupil's Textbook and Teacher's Handbook

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Appendix 2

Teachers Questionnaire

No. | | | |

TEACHERS QUESTIONNAIRE

SURVEYING QATARI PRIMARY SCHOOLS SCIENCE TEACHERS' PERCEPTIONS TOWARDS TRADITIONAL TEACHING METHODS AND CO-OPERATIVE LEARNING

School of Education/Qatar University

1994

Covering Letter

Dear teacher,

Peace, blessings and the mercy of Allah be upon you.

The enclosed questionnaire is part of my Ph.D. study. The purpose of this study is to explore the feasibility and effectiveness of co-operative learning methods in science education in Qatari primary schools. I would appreciate your assistance and efforts in gathering information. Your responses will remain anonymous.

I appreciate your co-operation in answering every question objectively and truthfully.

Abdul Aziz Al-Hor

For research use only

CONFIDENTIAL

University of Qatar/College of Education
Surveying teachers' opinions about traditional teaching methods and co-operative learning

Section 1

I am conducting a study on co-operative learning strategies and would appreciate your assistance in gathering information. I would like your opinions. Your responses will remain anonymous.

For the following questions, please tick the appropriate box:

1. Sex
   - male ☐
   - female ☐

2. Age
   - under 25 ☐
   - 25 - 29 ☐
   - 30 - 34 ☐
   - 35 - 39 ☐
   - 40 - 44 ☐
   - 45 - 49 ☐
   - 50 - 54 ☐
   - over 54 ☐

3. Years of experience
   - 1 - 2 years ☐
   - 3 - 5 ☐
   - 6 - 10 ☐
   - more than 10 ☐

4. Nationality
   - Qatari ☐
   - non-Qatari ☐

5. Which of the listed qualifications is the highest you have completed?
   - 5.1 Highschool Diploma ☐
   - 5.2 Two years Teaching Diploma ☐
   - 5.3 Four years College Diploma ☐
   - 5.4 Advanced Diploma in Education ☐

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5.5 Master's Degree in Education ☐
5.6 Other (please specify) ☐

_____

6. In my class I mainly use:

6.1 Lecturing Approach ☐
6.2 Discovery Learning ☐
6.3 Problem Solving ☐ ☐
6.4 Small-group Learning Approach ☐
Other (please specify) ☐

_____

7. When teaching in the laboratory I usually:

7.1 demonstrate scientific experiment and activities myself, however, sometimes I ask pupils to take part in the demonstration processes. ☐ ☐
7.2 allow pupils to carry out and demonstrate all scientific experiments and activities by themselves, while I monitor their work. ☐ ☐

8. Please list alternative teaching methods you would like to try in your classroom besides your teaching methods.

8.1 _____ ☐
8.2 _____ ☐ ☐
8.3 _____ ☐

Section 2

For each question, please circle the number which corresponds to your opinion. If you change your mind put a cross through it and circle another.

This is definitely true	1
This is usually true	2
This is usually not true	3
This is definitely not true	4

		Definitely true	Usually true	Usually not true	Definitely not true	For research use only
9.	The advantages of my teaching methods are:					
	9.1 Increasing pupils' interaction in the classroom.	1	2	3	4	☐
	9.2 Making the lesson more exciting	1	2	3	4	☐
	9.3 Controlling pupils' behaviour	1	2	3	4	☐
	9.4 Developing social skills such as co-operation and listening to others carefully	1	2	3	4	☐
	9.5 Enhancing pupils' motivation	1	2	3	4	☐
	9.6 Developing critical thinking	1	2	3	4	☐
	9.7 Using various stimuli	1	2	3	4	☐
	9.8 Paying attention to cognitive skills such as deduction and induction	1	2	3	4	☐
	9.9 Using pupils' background and experiences to build on	1	2	3	4	☐
	9.10 Paying attention to motor skills such as building and writing	1	2	3	4	☐
	9.11 Increasing pupils' achievement	1	2	3	4	☐
	9.12 Relating science in schools to real life	1	2	3	4	☐
	9.13 Evaluating all learning domains cognitive, psychomotor and affective	1	2	3	4	☐
	9.14 Using external resources in addition to text book such as library and environment	1	2	3	4	☐
	Others (please list)					
	9.15	1	2	3	4	☐
	9.16	1	2	3	4	☐
	9.17	1	2	3	4	☐
10.	The disadvantages of my teaching methods are:	1	2	3	4	
	10.1 Does not promote critical thinking	1	2	3	4	☐
	10.2 Focuses on memorisation	1	2	3	4	☐
	10.3 Does not motivate pupils to learn better	1	2	3	4	☐
	10.4 Transfers literally what is in the text book	1	2	3	4	☐
	10.5 Focuses on the cognitive domain of learning only	1	2	3	4	☐

	Definitely true	Usually true	Usually not true	Definitely not true	
10.6 Does not promote participation in the classroom	1	2	3	4	☐
10.7 Focuses on the facts rather than on scientific processes	1	2	3	4	☐
10.8 Does not relate science to real life	1	2	3	4	☐
10.9 Evaluates pupils' memorisation	1	2	3	4	☐
10.10 Does not use various stimuli	1	2	3	4	☐
10.11 Teacher does almost everything	1	2	3	4	☐
10.12 Does not help pupils understand science	1	2	3	4	☐
Others (please specify)					
10.13	1	2	3	4	☐
10.14	1	2	3	4	☐
10.15	1	2	3	4	☐
11. Competing with other pupils is a good way for pupils to learn	1	2	3	4	☐
12. I like my pupils to work individually and quietly	1	2	3	4	☐
13. Pupils learn a lot from working with pupils of similar ability	1	2	3	4	☐
14. In my classes pupils help each other with their school work	1	2	3	4	☐
15. In my classes I organise activities that require pupils to work in groups	1	2	3	4	☐
16. I am irritated by pupils talking to each other during my class	1	2	3	4	☐
17. I like my pupils to share their ideas and materials with each other	1	2	3	4	☐
18. The science curriculum is too demanding to adopt new teaching methods	1	2	3	4	☐
19. I like my pupils to carry out scientific experiments in groups	1	2	3	4	☐

		Definitely true	Usually true	Usually not true	Definitely not true	For research use only
20.	I am considering allowing pupils to work in small groups in my classes.	1	2	3	4	☐

Section 3

For the following question, please circle the number which corresponds to your opinion. If you change your mind put a cross through it and circle another.

Definitely expected	1
Usually expected	2
Usually not expected	3
Definitely not expected	4

		Definitely expected	Usually expected	Usually not expected	Definitely not expected	
	Suppose you had your pupils working in small groups to achieve group goal, what are the expected advantages and disadvantages?					
21.	The advantages:					
	21.1 Increases pupils' achievement	1	2	3	4	☐
	21.2 Increases pupils' motivation	1	2	3	4	☐
	21.3 Develops social skills (co-operation, accepting others' point of view)	1	2	3	4	☐
	21.4 Enhance self esteem	1	2	3	4	☐
	21.5 Develops critical thinking	1	2	3	4	☐
	21.6 Improves pupils' attitudes towards learning	1	2	3	4	☐
	21.7 Improves pupils' behaviour	1	2	3	4	☐
	21.8 Develops better relationships among pupils	1	2	3	4	☐
	Others (please specify)					
	21.9	1	2	3	4	☐
	21.10	1	2	3	4	☐
	21.11	1	2	3	4	☐
22.	The disadvantages:					
	22.1 Needs more time than what is available for teaching science	1	2	3	4	☐
	22.2 Needs equipment and tools more than what is available	1	2	3	4	☐
	22.3 School buildings are not appropriate for small group learning	1	2	3	4	☐

		Definitely expected	Usually expected	Usually not expected	Definitely not expected	For research use only
	22.4 Science curriculum is too extensive to adopt this teaching method	1	2	3	4	☐
	22.5 Classrooms are over-populated to use this type of learning	1	2	3	4	☐
	22.6 Increases negative behaviour in the classroom	1	2	3	4	☐
	Others (please specify)	1	2	3	4	
	22.7	1	2	3	4	☐
	22.8	1	2	3	4	☐
	Suppose you had your pupils working together in small groups to achieve a common goal, what are expected difficulties you are likely to encounter in terms of cultural, resources and behavioural difficulties?					
23	Cultural difficulties					
	23.1 Parents encourage their children to compete with others	1	2	3	4	☐
	23.2 The society encourages competition	1	2	3	4	☐
	23.3 Pupils are used to competitive learning	1	2	3	4	☐
	23.4 Teachers are used to competitive learning	1	2	3	4	☐
	Others (please specify)					
	23.5	1	2	3	4	☐
	23.6	1	2	3	4	☐
	23.7	1	2	3	4	☐
24.	Resource difficulties					
	24.1 Inadequate number of equipment	1	2	3	4	☐
	24.2 Lack of suitable books in co-operative learning	1	2	3	4	☐
	24.3 Lack of materials designed for co-operative learning	1	2	3	4	☐

	Definitely expected	Usually expected	Usually not expected	Definitely not expected	For research use only
24.4 Inappropriate buildings and classrooms designed for small group work	1	2	3	4	☐
Others (please specify)					☐
24.5	1	2	3	4	☐
24.6	1	2	3	4	☐
24.7	1	2	3	4	☐
25. Behavioural difficulties					
25.1 Increases the disorder in the class	1	2	3	4	☐
25.2 Increases the noise in the class	1	2	3	4	☐
25.3 One pupil might take over or control the group	1	2	3	4	☐
25.4 Reluctance of some pupils to participate	1	2	3	4	☐
25.5 The teacher loses the control over the classroom	1	2	3	4	☐
25.6 Engagement of pupils in non-task talking	1	2	3	4	☐
Others (please specify)					☐
25.7	1	2	3	4	☐
25.7	1	2	3	4	☐
25.9	1	2	3	4	☐
26. If you possess any other information not requested in this questionnaire which you think is relevant to this study, please give details below.					☐
26.1	1	2	3	4	☐
26.2	1	2	3	4	☐
26.3	1	2	3	4	☐

Thank you for completing this questionnaire

Appendix 3

Pupils' Pre-Questionnaire

No. | | | |

PUPILS' PRE-QUESTIONNAIRE

SURVEYING PUPILS' PERCEPTIONS TOWARDS TRADITIONAL LEARNING AND CO-OPERATIVE LEARNING

1994

University of Qatar/College of Education
Pupils' Pre-Questionnaire

Grade _____ No. | | | |

Your teacher's name _____

For each question, please circle the number which corresponds with your feelings. If you change your mind put a cross through it and circle another. If the statement is:

Definitely not true	No	1
Usually not true	no	2
Usually true	yes	3
Definitely true	Yes	4

		No	no	yes	Yes	For research use only
1.	The way we learn science is boring	1	2	3	4	☐
2.	My teacher uses most of the lesson time talking, explaining and instructing	1	2	3	4	☐
3.	The way we are being taught does not help to understand science	1	2	3	4	☐
4.	My teacher presents outside resources in addition to text book	1	2	3	4	☐
5.	I find it hard to speak my thoughts clearly in class	1	2	3	4	☐
6.	My science teacher asks us to memorise facts in science	1	2	3	4	☐
7.	When I do not understand something in science I ask other pupils to help me understand	1	2	3	4	☐
8.	If I work with other pupils in small groups I would have the chance to speak out my thoughts	1	2	3	4	☐
9.	If I work with other pupils in small groups it would help me to accept others' opinions	1	2	3	4	☐
10.	If I work with other pupils in small groups I would feel that I am responsible for helping other pupils to learn	1	2	3	4	☐

		No	no	yes	Yes	For research use only
11.	If I work with other pupils in small groups I would enjoy listening to other pupils' opinions	1	2	3	4	☐
12.	I would like to carry out scientific experiments with other pupils in small groups.	1	2	3	4	☐
13.	If I work with other pupils in small groups I would like to share ideas and materials with other pupils	1	2	3	4	☐
14.	If I work with other pupils in small groups there would be pupils in the group to help me learn	1	2	3	4	☐
15.	If I work with other pupils in small groups I would like to help other pupils to learn	1	2	3	4	☐
16.	If I work with other pupils in small groups I will make sure that everyone in the group learns the assigned materials	1	2	3	4	☐
17.	If I work with other pupils in small groups I would learn new things from discussing the assigned materials with other pupils	1	2	3	4	☐
18.	In our class our grade depends on how much all pupils learn	1	2	3	4	☐
19.	In our class the teacher divides up the material so that everyone has a part and everyone has to share his ideas	1	2	3	4	☐
20.	In class everyone's ideas are needed if we are going to be successful	1	2	3	4	☐
21.	Working with other pupils in small groups is better than working alone	1	2	3	4	☐
22.	In our class we do not talk to other pupils when we work	1	2	3	4	☐
23.	If I work in small groups I would feel anxious when I debate with other pupils	1	2	3	4	☐
24.	I like the challenge of seeing who is best at science in class	1	2	3	4	☐

		No	no	yes	Yes	For research use only
25.	I work to get better grades than other pupils do	1	2	3	4	☐
26.	I do better work when I work alone	1	2	3	4	☐
27.	Working with other pupils in small groups does not help me understand science	1	2	3	4	☐
28.	When working in small groups, some pupils try to control the group	1	2	3	4	☐
29.	If I work with other pupils in small groups I would waste my time helping other pupils	1	2	3	4	☐
30.	I feel bad when I get lower scores than other pupils in the class	1	2	3	4	☐
31.	My parents encourage me to get the highest scores in the class	1	2	3	4	☐
32.	My parents usually compare my scores with other pupils' scores	1	2	3	4	☐
33.	I like to know that my performance is better than others in the class	1	2	3	4	☐
34.	I do not like discussion in the class	1	2	3	4	☐
35.	I do not like other pupils to get scores higher than mine	1	2	3	4	☐

Thank you for completing this questionnaire

Appendix 4

Pupils' Post-Questionnaire

No. | | | |

PUPILS' POST-QUESTIONNAIRE

SURVEYING PUPILS' PERCEPTIONS TOWARDS TRADITIONAL LEARNING AND CO-OPERATIVE LEARNING

1994

University of Qatar/College of Education
Pupils' Post-Questionnaire

Grade _____ No. | | | |

Your teacher's name _____

For each question, please circle the number which corresponds with your feelings. If you change your mind put a cross through it and circle another. If the statement is:

Definitely not true	No	1
Usually not true	no	2
Usually true	yes	3
Definitely true	Yes	4

		No	no	yes	Yes	For research use only
1.	The way we learn science is boring.	1	2	3	4	☐
2.	My teacher uses most of the lesson time talking, explaining and instructing.	1	2	3	4	☐
3.	The way we are being taught does not help us understand science.	1	2	3	4	☐
4.	My teacher presents outside resources in addition to the textbook.	1	2	3	4	☐
5.	I find it hard to speak my thoughts clearly in class.	1	2	3	4	☐
6.	My science teacher asks us to memorise facts in science.	1	2	3	4	☐
7.	When I do not understand something in science I ask other pupils to help me understand.	1	2	3	4	☐
8.	When I worked with other pupils in small groups I had the opportunity to speak my thoughts.	1	2	3	4	☐
9.	Working with other pupils in small groups helped me accept others' opinions.	1	2	3	4	☐
10.	When I worked with other pupils in small groups I felt that I as responsible for helping other pupils to learn.	1	2	3	4	☐

		No	no	yes	Yes	For research use only
11.	When I worked with other pupils in small groups I enjoyed listening to other pupils' opinions.	1	2	3	4	☐
12.	I enjoyed carrying out scientific experiments with other pupils in small groups.	1	2	3	4	☐
13.	When I worked with other pupils in small groups I liked to share ideas and materials with them.	1	2	3	4	☐
14.	When I worked with other pupils in small groups, there were pupils in the group who I liked to help me learn.	1	2	3	4	☐
15.	When I worked with other pupils in small groups I liked to help other pupils to learn.	1	2	3	4	☐
16.	When I worked with other pupils in small groups I made sure that everyone in the group learnt the assigned materials.	1	2	3	4	☐
17.	When I worked with other pupils in small groups I learnt new things from discussing the assigned materials with other pupils.	1	2	3	4	☐
18.	In class our goals depend on how much all pupils learn.	1	2	3	4	☐
19.	In our class the teacher divides up the materials so that everyone has a part and everyone has to share his ideas.	1	2	3	4	☐
20.	In class everyone's ideas are needed if we are going to be successful.	1	2	3	4	☐
21.	Working with other pupils in small groups is better than working alone.	1	2	3	4	☐
22.	In our class we do not talk to other pupils when we work.	1	2	3	4	☐
23.	Debating with other pupils in groups made me feel anxious.	1	2	3	4	☐
24.	I like the challenge of seeing who is best in the class at science.	1	2	3	4	☐
25.	I work to get better grades than other pupils.	1	2	3	4	☐

		No	no	yes	Yes	For research use only
26.	I work better when I work alone.	1	2	3	4	☐
27.	Working with other pupils in small groups helped me understand science.	1	2	3	4	☐
28.	When I worked with other pupils in small groups there were some pupils who tried to control the group.	1	2	3	4	☐
29.	When I worked with other pupils in small groups I wasted my time helping other pupils in the class.	1	2	3	4	☐
30.	I feel bad when I get lower scores than other pupils in the class.	1	2	3	4	☐
31.	My parents encourage me to get the highest score in the class.	1	2	3	4	☐
32.	My parents usually compare my scores with other pupils' scores.	1	2	3	4	☐
33.	I like to know that my performance is better than others; in the class.	1	2	3	4	☐
34.	I do not like discussion in class.	1	2	3	4	☐
35.	I do not like other pupils to get scores higher than mine.	1	2	3	4	☐

Thank you for completing this questionnaire

Appendix 5

The Pre-Interview Schedule

1. What is your definition of the traditional teaching method?

2. How would you describe your teaching method?

3. Are you encountering any difficulties in teaching the present science curriculum?

4. At present, are you looking for new teaching methods to apply in your classroom?

5. As a teacher, do you have complete freedom to adopt any teaching method that you find suitable for your classroom?

6. What are the advantages and limitations of the co-operative learning methods?

7. Do you expect any criticism from your colleagues if you apply the co-operative learning method in your classroom?

8. Do you expect any cultural, behavioural or resource-related difficulties in implementing co-operative learning in Qatari primary schools?

9. How can you overcome these difficulties?

10. Do you think that teachers in Qatar should be trained to use co-operative learning in their classrooms?

11. Are you ready for implementing co-operative learning in classrooms?

Appendix 6

The Post-Interview Schedule

1. Were you ready to implement co-operative learning in classrooms before starting to teach the experimental lessons?

2. How would you evaluate your implementation of the co-operative learning method in classrooms?

3. How did you overcome the difficulties that you encountered during the experimental lessons?

4. How would you describe your pupils' motivation and enthusiasm during the experience of co-operative learning?

5. How would you describe your motivation and enthusiasm during the experimental lessons?

6. Have you faced any criticism from your fellow teachers?

7. What improvements do you suggest are necessary to increase the effectiveness of the co-operative learning training programme?

8. Are there any advantages of co-operative learning?

9. Would you continue to use co-operative learning in the future?

10. Do you think that teachers in Qatar should be trained to use co-operative learning in their classrooms?

11. Are you aware of any teaching method that would give a better result than co-operative learning?

Appendix 7

Teacher Observation Checklist and Report Sheet

Report Sheet on Teacher

Teacher's name: Observer's name:

School's name: Grade:

Class number: Length of observation:

Date: Topic:

Description:

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Behaviour	Yes	No	Comments
1. Making decisions			
1.1 Are pupils assigned different roles? • Manager • Recorder • Encourager • Communicator • Checker • Reader • Observer • Summariser			
1.2 What is the pattern of group formation? • Random • Friendship • Ability			
1.3 What is the size of the group? _____			
2. Formulating objectives			
2.1 Does the teacher specify academic objectives?			
2.2 Does the teacher specify social objectives?			
3. Structuring the task and interdependence			
3.1 Does the teacher plan the task to promote interdependence?			
3.1.1 Is there a group goal?			
3.1.2 Does the teacher encourage pupils to work together to achieve the group goal?			

Behaviour	Yes	No	Comments
3.2 Does the teacher explain the task so that pupils are clear about the assignment?			
4. Monitoring and intervening			
4.1 Does the teacher provide task assistance by himself?			
4.2 Does the teacher ask groups to help each other?			
4.3 Does the teacher monitor the group's processes? • uses observation checklists • walks through groups • sits with each group			
4.4 Does the teacher specify desired behaviours? • discuss quietly • listen to your groupmate • move quickly and quietly • do your job • accept others' opinions • share your thoughts • share your materials • make sure that everybody has learned the task			
4.5 Does the teacher control the classroom? • by asking groupmates to monitor each other's behaviour? • by himself? • by using group reward and punishment			
4.6 Does the teacher use observation checklists?			
4.7 Does the teacher walk through the groups?			

Behaviour	Yes	No	Comments
4.8 Does the teacher sit with each group?			
Assessment			
5.1 Does the teacher explain the criteria for success?			
5.1.1 Does the teacher set individual evaluations (oral or written)?			
5.1.2 Does the teacher make sure that all members in a group learned the assigned materials?			
5.1.3 Does the teacher reward groups for their joint work?			
5.1.4 Does the teacher praise groupwork?			

Appendix 8

Pupil Observation Checklist and Report Sheet

Report Sheet on Pupils

Group's name: Observer's name:

Teacher's name: Grade:

Class number: Length of observation:

Date: Topic:

Description:

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Behaviour	Yes	No	Comments
1. Pupils' roles in group			
1.1 Are pupils assigned different roles? • Manager • Recorder • Encourager • Communicator • Checker • Reader			
1.2 Is everybody doing his job? • Manager • Recorder • Encourager • Communicator • Checker • Reader			
1.3 Is everyone in the group contributing verbally? • Manager • Recorder • Encourager • Communicator • Checker • Reader			
2. Discussion in the group			
2.1 Do pupils encourage others' ideas?			
2.2 Do pupils discuss others' ideas?			
2.3 Do pupils listen to each other carefully?			
2.4 Do pupils respect each others' opinions?			

Behaviour	Yes	No	Comments
3. *Co-operation and interdependence*			
3.1 Do pupils share materials?			
3.2 Do pupils write jointly? • Do pupils help each other to finish the assigned materials? • Do pupils make sure that everyone in the group has learned the materials? • Do pupils ask each other when they do not understand something?			
4. *Pupils' behaviour*			
4.1 Are there any particular pupils controlling the group?			
4.2 Are there any reluctant pupils?			
4.3 Are pupils engaging in off-task behaviour? • Non-task talking • Daydreaming • Wandering around • Working at other tasks • Physically disturbing other pupils • Attempting to gain attention			
4.4 Do pupils monitor each others' behaviour?			
4.5 Do pupils complain about working with each other?			
4.6 Are pupils working enthusiastically in the group?			

Appendix 9

Diary Entries during the Training Programme

Entry 1

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. Is there a real problem with existing teaching methods in Qatari primary schools? If so, what is it?

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Entry 2

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. Are there any difficulties that you encountered in being introduced to co-operative learning methods?

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Entry 3

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. Are there any difficulties in understanding the roles of the teacher in co-operative learning situations?

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Entry 4

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. Evaluate the microteaching lessons in terms of the positive aspects and the limitations of the lessons.

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Entry 5

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. What are the potential advantages of and difficulties in implementing co-operative learning in practice?

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Entry 6

Teachers' name:

School:

Date:

Themes

1. Record your feelings, reflections and comment on today's workshop.

2. Evaluate the training programme in terms of how it was prepared, its organisation, its content and its duration.

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Appendix 10

Diary Entries during Implementation of Co-operative Learning

Diary Entry

Teachers' name:

School:

Date:

Themes

1. The advantages and difficulties encountered in experiencing co-operative learning in terms of

   - the teacher's role
   - pupils' roles
   - preparation
   - group processes
   - classroom control
   - pupils' responses

2. General reflections, feelings and comments.

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Appendix 11

Co-operative Learning Workshop Training Manual

Co-operative Learning
Workshop Training Manual

1994

Contents

Introduction

For the last ten years, co-operative learning procedures are increasingly being used in public and private schools and colleges in America and United Kingdom. As this use grows, there is a need to understand the procedures teachers use to implement co-operative learning in their classrooms, the literature claiming to validate its effectiveness, and the methods of modifying existing curriculum units to include co-operative lessons.

This workshop is designed to address these issues and enable teachers to work more effectively when implementing co-operative learning in classrooms. In order to accomplish this, teachers have to have an understanding of what co-operative learning is, and how to include it in their classroom practice.

Who is this workshop for?

This workshop has been designed for teachers who are responsible for teaching in primary schools, particularly science subjects; however, this workshop can include staff working in a wide variety of educational settings such as schoolteachers at all stages, lecturers in higher and further education and adult education tutors.

It is assumed that teachers who will participate in the workshop will have some interest in science education, without being particularly expert in co-operative learning.

Aims of the workshop

This workshop lasts six days and contains a series of activities. Workshop members will examine the issue of co-operative learning, and the procedures for implementing it in classrooms.

By the end of the training programme teachers should:

- be able to identify the advantages and limitations of teaching science by traditional methods
- be able to describe and discuss new trends of teaching science in primary schools
- be familiar with the concept of co-operative learning
- be familiar with research on co-operative learning techniques
- learn how to implement co-operative learning in classrooms
- be better prepared to deal with problems that may arise during the implementation of co-operative learning techniques

- have experienced team building activities and group learning experiences

Preparation

Group size

The workshop will be run with a group of eight participants.

They will be science teachers for primary schools.

The researcher will act as a leader of the workshop.

Venue

Efforts will be made to provide the participants with a comfortable, interesting and relaxed learning climate which would set a non-threatening tone for the workshop and reduce participants' anxiety levels. Careful attention will be given to ensuring that the rooms, facilities, equipment and furniture are functional and conducive to better learning and participation.

Preparing workshop members

The potential workshop members will be informed well in advance of the purpose of the workshop and given an outline of the contents. This will be in the form of a programme that clearly states the workshop aims and content to avoid confusion about the purpose of the workshop and unrealistic expectations. Moreover, the researcher will make personal contact with the workshop members prior to the workshop, and listen to their views and concerns about the co-operative learning teaching methods. This will help to improve the relationship between the researcher and participants.

Preparing the materials

The researcher will make enough copies in advance of the handouts that will be used during the workshop.

Supplementary materials such as overhead projector and transparencies, supply of marker pens, glue, scissors, masking tape, plane papers and chalk board will be arranged prior to the workshop.

Suggested timetable

The workshop is designed to take six days, three hours and fifteen minutes daily, starting at 8.30 a.m. and finishing at 12.30 p.m., with a short coffee break. Suggested timings are given for each of the workshop stages, but the workshop leader will be flexible and adjust these timings to the needs of the group. However, the start, coffee, and finish times will be fixed whenever possible.

Day	Activity	Time	Brief description	Notes
1	1	8.30 – 9.15	Welcome. Introductions. Aims of the workshop.	
	2	9.15 – 9.45	Working in groups	
	3	9.45 – 10.15	What is science?	
		10.15 – 10.45	Coffee	
	4	10.45 – 11.20	Science at home	
	5	11.20 – 12.00	How science is taught at present	
		12.00 – 12.30	Writing diary	
2	6	8.30 – 9.15	What skills are we trying to teach?	
	7	9.15 – 10.15	Alternative ways of teaching science	
		10.15 – 10.45	Coffee	
	8	10.45 – 11.45	What does research tell us about co-operative learning?	
		11.45 – 12.30	Writing diary	
3	9	8.30 – 9.20	The teacher's roles in co-operative learning	
	10	9.20 – 10.15	The teacher's roles in co-operative learning	
		10.15 – 10.45	Coffee	
	11	10.45 – 11.45	What did you observe?	
	12	11.45 – 12.00	Preparing co-operative learning lessons	

Day	Activity	Time	Brief description	Notes
		12.00 – 12.30	Writing diary	
4	13	8.30 – 10.15	Experiencing co-operative learning	
		10.15 – 10.45	Coffee	
	14	10.45 – 12.00	Evaluation	
		12.00 – 12.30	Writing diary	
5	15	8.30 – 10.15	Preparing co-operative learning lessons	
	16	10.45 – 11.45	Potential problems in implementing co-operative learning and possible solutions	
		11.45 – 12.30	Writing diary	
6	17	8.30 – 10.00	Evaluating the training programme	
		10.00 – 10.30	Coffee	
		10.30 – 11.00	End of workshop	

Activity 1 Welcome. Introductions. Aims of the workshop.

Suggested timing 45 minutes

Aims

To introduce the workshop leader and workshop members.

To clarify the aims of the workshop.

To provide information about the workshop facilities and arrangements.

Materials needed

Flipchart with aims of the workshop as decided in advance by the leader, written up clearly; flipchart paper; marker pens; plain sheets.

Directions

- The leader will introduce himself to the workshop members.

- The leader will ask workshop members to work in groups of four to get to know each other and report back to the rest of the group. Members will ask each other questions about interests, hobbies, professional experience and family background.

- The aims of the workshop will be introduced using the prepared flipchart. Aims will be kept prominently displayed during the workshop.

- The importance of the participative nature of the workshop and the value of benefiting from the experience of the whole group will be stressed.

- The leader of the workshop will obtain the agreement of the workshop members concerning the basic rules for the workshop, which can be written up on the flipchart.

- The rules are as follows:

  – Keep to time.

  – Encourage personal contributions from participants.

  – Any information shared is absolutely confidential.

  Note: workshop members are encouraged to add other rules.

- The leader will provide necessary information about the facilities and workshop arrangements: timetable, coffee, location, toilets, smoking, etc.

Activity 2 Working in groups

Suggested timing 30 minutes

Aims

To illustrate the different responses given by individuals and groups.

Materials needed

Science questions – a copy for each workshop member (Handout 1).

Directions

- Workshop members will be asked to answer individually a set of prepared general science questions.
- Workshop members will be asked to work in pairs to answer the same science questions.
- The scores for both exercises will be given to workshop members individually, so members' scores will remain anonymous.
- Members will be asked to compare both scores to discover the different responses given by individuals and groups.

Activity 3 What is science?

Suggested timing 30 minutes

Aim

To illustrate teachers' conception of science.

Materials needed

Flipchart; marker pens.

Directions

- Ask workshop members to work in pairs to inform an outside visitor briefly about the following questions:

  What is science?

  What science should primary schools be concerned with?

  How does the new curriculum define science?

- Ask each pair to present their answers to the above questions using the flipchart and marker pens.

- Encourage workshop members to contribute and share their thoughts during and after the presentations.

- Summarise the key ideas of the presentations and discuss how experts in the field of science education perceive the above questions.

Activity 4 Science at home

Suggested timing 35 minutes

Aim

To describe what science children learn at home.

To understand how children learn science at home.

Materials needed

Flipchart; marker pens.

Directions

- Introduce an outside visitor to the workshop members.
- Ask workshop members to work in pairs to discuss and brainstorm the following questions:

  What science do children learn at home?

  How do children learn science at home?

- The visitor will lead the discussion on the topic.
- Ask each pair to present the conclusion of their discussion.
- The visitor will comment on the presentation and will elaborate on the topic.
- The leader will summarise the key ideas of the presentations.

Activity 5 How science is taught at present

Suggested timing 40 minutes

Aims

To describe how teachers teach science at present.

To learn to what extent existing approaches to teaching correspond with the aims outlined by the Ministry of Education.

Materials needed

Flipcharts; marker pens; reading materials (Handout 2).

Directions

- Ask workshop members to work in pairs to describe the existing science teaching methods in Qatar. The discussion will focus on the following questions:
  - How do teachers teach science at present?
  - Do the existing teaching approaches enable the aims outlined by the Ministry of Education to be met?
  - What difficulties do teachers encounter in teaching science in primary school?
  - Do our teaching methods allow children to discuss things together?
  - Do we encourage children to help each other with schoolwork?
  - Do children take an active role in our classes?
- Lead a discussion on this topic to highlight the above questions.
- Encourage workshop members to contribute to the topic drawing on their discussion with their partners.
- Summarise the key points in the discussion.

Activity 6 What skills are we trying to teach?

Suggested timing 45 minutes

Aim

To list skills children need to acquire.

To identify what we want children to understand about science.

Materials needed

Flipchart; marker pens.

Directions

- Ask workshop members to work in pairs (different pairs from in the last activity), to list what science skills children need to learn in school and what children should understand about science.
- The visitor will lead the discussion of the topic.
- Ask each pair to present what they think of as being the skills children need to learn.
- Encourage participants to contribute to the presentation by comments and questions.
- The visitor will comment on the presentation and will elaborate on the topic.

Activity 7 Alternative ways of teaching science

Suggested timing 60 minutes

Aims

To list alternative ways of teaching science.

To introduce co-operative learning as an alternative method of teaching science.

Materials needed

Flipchart; marker pens.

Directions

- Ask workshop members to work in pairs to list alternative methods of teaching science, itemising their advantages and limitations.
- An outside visitor in the field of science education will be invited to lead a discussion on this topic.
- Each pair will present a summary of their discussion using the flipchart.
- The visitor will comment on the presentations and will discuss in more detail alternative methods of teaching science.
- Briefly introduce co-operative learning as an alternative method of teaching science at primary level.

Activity 8 What does research tell us about co-operative learning?

Suggested timing 60 minutes

Aim

To discuss briefly research on co-operative learning techniques.

Materials needed

Overhead projector; marker pens; reading materials (Handout 3).

Direction

- The leader will discuss critically the literature on co-operative learning techniques. This discussion will cover the following areas:
  - the basic concepts of co-operative learning
  - theoretical background
  - co-operative learning methods
  - outcomes of co-operative learning techniques
- After the presentation, workshop members will be encouraged to discuss and criticise the research findings.
- Ask workshop members to work in pairs to plan a co-operative learning lesson based on their understanding of the presentation.
- Ask the two pairs to discuss and evaluate their lesson plans together.

Activity 9 What did you observe?

Suggested timing 60 minutes.

Aim

To enable workshop members to gain a greater understanding of the procedures for implementing co-operative learning in classrooms.

Materials needed

Video; TV; videotape; report sheet.

Direction

- The leader of the workshop will introduce a video on co-operative learning and clarify the purpose of this activity.
- Workshop members will be asked to work in pairs. The task is to observe the video and write a report on the material contained on it.
- Each group will be given time to present its report containing its observations.
- An open discussion on the content of video will take place after the presentation.

Activity 10 The teacher's roles in co-operative learning

Suggested timing 50 minutes.

Aim

To identify the teacher's roles in co-operative learning.

Materials needed

Reading material, 'The teacher's role in co-operative learning', in *Co-operation in the Classroom* (Johnson, Johnson and Holubec, 1991, ss 2:2 – 2:15).

Directions

- One day prior to this activity workshop members will be given the above reading materials to read and analyse. The teacher's roles include:
  - Formulating objectives and making decisions
  - Structuring the task and positive interdependence
- The leader will lead an open discussion on the teacher's roles in co-operative learning. The discussion will focus on the following questions:
  - What are the first two roles of the teacher in co-operative learning?
  - What are the possible patterns for grouping pupils?
  - What are the advantages and limitations of each pattern of grouping?
  - How should the size of groups be determined?
  - How should groups in the class be organised?
  - What is the role of the pupils in the groups?
  - What are the difficulties for pupils in assuming these roles?
  - How can you promote interdependence in your classroom?
  - How can you promote individual accountability in your classroom?
- The leader will summarize the key ideas of the discussion and present them to the workshop members.

Activity 11 The teacher's roles in co-operative learning

Suggested timing 55 minutes

Aim

To learn how to implement co-operative learning in practice.

Materials needed

Reading material, 'The teacher's roles in co-operative learning', in *Co-operation in the Classroom* (Johnson, Johnson and Holubec, 1991, ss 2:17–2:25); *Assessing Groupwork* (Bennett and Dunne, 1992, pp. 171–87).

Directions

- One day prior to this activity workshop members will be given 'The teacher's roles in co-operative learning' to read and analyse. The teacher's roles include:
  - classroom management
  - reward structures
  - assessment modes
- The leader will lead an open discussion on the practical issues. The discussion will focus on the following questions:
  - How should classroom control be implemented?
  - Is there a need for rewards in the classroom?
  - How should pupils be rewarded?
  - How can groups and individuals be assessed?
  - What are the difficulties in rewarding and assessing pupils?
- Teachers will be encouraged to contribute and to express any concerns and opinions.

Activity 12 Preparing co-operative learning lessons

Suggested timing 45 minutes.

Aim

To learn how to prepare co-operative learning lesson and materials.

Material needed

Examples of co-operative learning lessons; overhead projector; marker pens; handout 4 'Planning Your Lesson'; science textbook (sixth-grade)

Direction

- The leader will present alternative lesson preparation plans via a demonstration of prepared lessons.

- The workshop members will work in a group to produce four lessons (two lessons per group) from the sixth-grade science textbook, using a preparation sheet specially designed for the co-operative learning lesson.

- Each group will demonstrate one of the prepared lessons in detail. The teacher will be encouraged to discuss, criticise, evaluate and make suggestions.

Activity 13 Experiencing co-operative learning

Suggested timing 105 minutes.

Aim

To experience co-operative teaching procedures.

Materials needed

Classroom; blackboard.

Directions

- Twelve primary school pupils will be invited to participate in this activity.
- Each pair who have designed one of the lessons in Activity 11 will be responsible for teaching it. While one teacher is teaching the other teacher will be observing.
- Teachers will be given the freedom to use any pattern for grouping pupils, size of group, reward structure or evaluation procedures.
- Teachers will be allowed 25 minutes for each lesson.
- Observers should observe and write notes on the following elements:
  - the pattern for grouping pupils
  - the size of groups
  - the role of the teacher, pupils and groups
  - reward structure
  - students' interaction

Activity 14 Evaluation

Suggested timing 75 minutes.

Aim

To evaluate the lessons taught in Activity 12 in terms of the teacher's effectiveness and the students' interaction.

Materials needed

Notepaper.

Directions

- Workshop members will be asked to work in pairs, with the same partner as in Activity 11. One partner will have taught the lesson, and one will evaluate and give feedback to the other.

- Each teacher who has taught a lesson will be asked to answer the following questions:
  - What did I learn?
  - What did children learn?
  - What would I do differently next time?
  - What would I do the same way next time?

- Ask the observers for Activity 12 to comment on the students' participation, interaction and attitudes during the lessons taught in Activity 12. The comments should focus on the following questions:
  - Were pupils coping with the concept of co-operative learning?
  - Were pupils interacting as they should?
  - Were groups functioning as they should?
  - Did pupils understand their roles?
  - Did pupils feel comfortable working with each other?

Activity 15 Potential problems in implementing co-operative learning and possible solutions

Suggested timing 60 minutes.

Aim

To familiarise teachers with potential classroom problems and possible ways of overcoming these problems.

Materials needed

Flipchart; marker pens.

Directions

- Ask workshop members to work in pairs. The task is to think about the potential problems and possible solutions.
- Each group will present the problems and possible solutions. Participants will be encouraged to join in the discussion.
- Present the findings of existing research on potential problems and their possible solutions.

Activity 16 Preparing co-operative learning lessons

Suggested timing 105 minutes.

Aim

To plan four co-operative learning lessons.

Materials needed

Lesson preparation sheet.

Directions

- Ask workshop members to work in pairs to plan four lessons from the sixth-grade science textbook.
- Each pair will present one of the prepared lessons in detail.
- Teachers will be encouraged to discuss and make suggestions.

Activity 17 Evaluating the training programme

Suggested timing 90 minutes.

Aim

To evaluate the effectiveness of the sixth workshop training programme in terms of preparation, organisation, usefulness, content and duration.

Materials needed

Notepaper.

Directions

- Teachers will be asked to write down individually their evaluation of the training programme.
- Each pair will present one of the prepared lessons in detail.
- Teachers will be encouraged to discuss and make suggestions.

Appendix 12

Handouts to Teachers for Use in the Training Programme

Handout 1 Warm-up exercises

1. A human being is able to listen to his own voice in a vacuum. Right or wrong?

2. We have three boxes, and in each box there are three more boxes and in these boxes there are another three boxes. What is the total number of boxes?

   33
   36
   39

3. Which part of the human body consumes 40 per cent of blood oxygen?

   The brain
   The heart
   The liver

4. The length of a piece of cloth is 8m. We want to divide it into 8 equal parts, and it takes one minute to cut one part. How long will it take to divide the cloth into the 8 equal parts?

   6 minutes
   7 minutes
   8 minutes

5. What is the name of the planet which is surrounded by circles of ice and dust?

   Pluto
   Jupiter
   Saturn

6. My age is equal to your age, and your age is equal to double my age minus 20 years. What is my age and what is your age?

   15
   20
   25

7. What part of its body does a snake use to smell with?

   It does not smell
   Tongue
   Skin

8. The total number of pupils in the fourth grade class is 25. If 60 per cent of the pupils succeed, what is the number of pupils who fail?

   8
   10
   12

9. Which part of the body disposes of liquids?

   The liver
   The pancreas
   The kidneys

10. Which is cheaper, to invite your friend to come with you to the football stadium 3 times, or to invite 3 friends to the football stadium once?

    The former
    The latter
    The same

11. If the hands of the watch indicate 2:20, what will the time be if the hour and minute hands are reversed?

12. It takes 3 men of similar strength 3 days to dig 3 bunkers. How many days will it take one man to dig one bunker?

    1 day
    2 days
    3 days

Handout 2 Teaching methods

Anderson and Burns (1989) offer a comprehensive definition of teaching, as follows:

> Teaching is an interpersonal, interactive activity, typically involving verbal communication, which is undertaken for the purpose of helping one or more students learn or change the ways in which they can or will behave. (p. 8)

This definition suggests that teaching is an intentional and interpersonal activity. However, there is no single teaching method which can be used all the time to satisfy all the learning domains (cognitive, affective and psychomotor). Reece and Walker (1994) argue that there are some important criteria which need to be considered when selecting teaching methods: for example, objectives to be achieved, group size, needs and characteristics of pupils, and motivation of pupils. Moreover, they suggest that teachers

> can use some strategies within other strategies, for instance using buzz groups within a lecture. As usual in education, there are few answers which are totally right or totally wrong. Some strategies appear to be more effective with certain students in certain situations. (p. 108)

However, in Qatari schools, most teachers use the didactic method all the time for teaching all subjects in their classrooms (Kamal, 1990; Al-Sada, 1992; Massialas and Jarrar, 1983). This method has been defined in the *Dictionary of Education* as follows:

> A lecture-based approach to teaching that is fairly rigid and that emphasises compliant behaviour on the part of the students while the teacher dispenses information. (Shafritz, 1988, p. 151)

In Qatari schools, teachers very often structure lessons competitively so that students work against each other to achieve a goal that only one or a few students can attain. Pupils are graded on a curve, which requires them to work faster and more accurately than their classmates. Massialas and Jarrar (1983) point out that the content of curricula in the Arab world is quantity-oriented; teaching and learning become

artificial, leading to rote memorisation which bores both students and teachers and is soon forgotten. The common practice is for teachers to lecture on a daily topic. Then, what little time remains is reserved for recitation of materials and for giving students a large amount of homework (Massialas and Jarrar, 1983). The emphasis on memorisation and lecturing is not unique to the Qatari education system, but linked to broader patterns of traditional and religious instruction in Islamic societies in the past. Tibawi (1972) described this phenomenon thus:

> The problem is rooted in Arabic and Islamic practice in the age of decadence when reliance on memory and learning by rote, adherence to existing texts and respect for authoritative opinion became established at lower or higher levels of education. Once the original Arab oral tradition was superseded by fixed written material, the teacher's function became more of a restrained transmitter and commentator and less of a resourceful adapter and innovator. (p. 211)

Al-Makkari (Nakosteen, 1964) describes the most common method of instruction in medieval Islam, pointing out that the formal delivery of lectures with students seated before the lecturer, was the prevailing method of instruction. The teacher read from pre-prepared materials, explaining the content of the materials, and allowed questions and discussion to follow the lecture. Students took complete notes for each lecture, an account of a lack of texts and printing at that time. Islamic education placed special emphasis on memory and considered it as the criterion of mastery. Goitein (1971) maintains that memorisation played a critical role in the process of mastering any of the Islamic sciences. Moreover, Al-Sakhawi (Berkey, 1992) points out that learners memorised their texts by means of a comprehensive training that stressed the role of memory; memorising four or five hundred manuscript lines per day was considered a noteworthy achievement. Exploration of knowledge, new teaching methods, theories of psychology and technology availed little to change the existing practice in the Muslim world. Therefore, in 1966, a conference of Arab teachers was held in

Alexandria at which a paper contributed by the Secretary General of the Egyptian Ministry of Education was read. It contained the following:

> It is noteworthy that despite the development of the subject matter of the syllabuses, their outstanding trends are still theoretical, and that despite the teachers' efforts to develop new teaching methods, the general work of existing methods is still dictation and delivery. This is, of course, contrary to the call for giving prominence to the practical and applied aspects of the prescribed syllabus, and for stressing the functional sides in the syllabus and their relation to man's social environment. Indeed, it is contrary to the repeated recommendations by educationists that pupils should participate in the process of learning, use their hands and carry out experiments, and that teaching methods should accord with this technological age by the employment of visual and aural aids in teaching. But these calls and recommendations failed to evoke genuine response from the majority of teachers, and the scholastic work still goes on in its old ways. (Tibawi, 1972, p. 212)

Eickelman (1976) maintains that the traditional patterns of teaching methods in the Muslim world ran deep, and where traditional Islamic education has survived in the modern world, memorisation of texts remains one of its central features. In this context, it seems that existing teaching methods in Qatar are actually rooted in Islamic and Arabic culture. Tibawi (1972) indicates that prior to the modern education system, the only formal and traditional education in the Muslim world, as well as in the Gulf region, was Kuttab education. This was religiously-oriented education, involving the teaching of the Koran, writing and reading. The teaching methods at the Kuttab focused on rote memorisation and were extremely simple and primitive (Al-Kobisi, 1979; Al-Nuri, 1950). Although the education system in Qatar has witnessed great improvement in various areas, traditional teaching methods remain, with little emphasis on change.

Bawazeer (1979) points out that teachers are concerned with preparing students for the passing of examinations, and emphasises the importance of memorisation. He goes on to say that, as a result of these methods of teaching, teachers become conveyors of information rather than facilitators of learning. He adds that, in this type of

environment, students tend to seek the teacher's approval rather than participate in discussion concerning evidence, findings and rationales. Moreover, Massialas and Jarrar (1983) indicate that students' participation in the classroom is very limited, and occurs only when they are asked to recite passages from the textbook or to answer questions. Students are seated in rows in overcrowded rooms, a physical arrangement which does not encourage face-to-face interaction.

Teaching science in Qatari schools

Despite the fact that the SCPS provides teachers with guidelines on effective teaching methods and detailed instructions for teaching the concepts and facts of the curriculum, teachers in Qatar are still using the traditional teaching methods in their classrooms. Al-Sada (1992) points out that the usual method of teaching science in Qatar is to focus on memorisation. The teacher's role is to deliver information, and so the teachers depend on textbook and blackboard as a means of illustrating facts and concepts. Al-Sada believes that this type of teaching ignores the student's opinions and needs. Moreover, it is content-oriented rather than oriented towards scientific progress. She investigated the extent to which female science teachers implement and use the new teaching methodologies, such as problem-solving, discovery learning and learning-by-doing, in their classrooms. Her findings were as follows:

1. The majority of teachers do not implement new teaching methodologies in their science classes.

2. Teachers do not encourage students to use what they have been taught in the outside world.

3. It is rare for teachers to encourage students to follow scientific procedures in discovering or solving problems.

4. It is rare for teachers to use educational films or scientific tools.

She adds that teachers reported a number of reasons for their existing practice, as follows:

1. The syllabus is too extensive.
2. The allocated time for teaching is insufficient.
3. The students are passive.

Handout 3 Why should children work in groups?

Introduction to co-operative learning

For many years, co-operative learning has been advocated as a teaching strategy and as a way to organise the classroom. In co-operative learning students of all performance levels work together in small groups toward a group goal (Slavin, 1987). Today, co-operative learning has become widespread and is being recommended as a solution to a variety of educational problems, from improving pupils' performance and social skills to enhancing the self-esteem of at-risk pupils. It has been also recommended as a means of improving students' attitudes towards teachers and school personnel, and their psychological health. Much research has been done on co-operative learning in the fields of education, psychology, sociology, science education and anthropology. Much of the research in the field of education has involved elementary school students and has dealt with its effects on student achievement, peer interaction, race relations and co-operation vs. competition (Johnson and Johnson, 1987; Slavin, 1987a or b).

Johnson and Johnson (1991) consider living in groups as one of the most important factors of humans' lives:

> All day long we interact first in one group and then in another. We live in a dwelling as part of a group, we learn in groups contained in the same classroom, we work in groups, we interact with friends in groups, and we spend much of our leisure time in groups ... As the effectiveness of our groups go, so goes the quality of life ... Educators are striving to understand better how to use co-operative learning groups ... There are many settings in which groups are being seen as important elements of improving productivity and effectiveness. (pp. 4–5)

From an educational point of view, experiential learning and group goals seem to be the main characteristics of co-operative groupwork. Johnson and Johnson write:

> We all learn from our experiences. From touching a hot stove we learn to avoid heated objects. Every day we have experiences we learn from. Many aspects of group dynamics can be learned only by experience. Hearing a lecture on resisting group pressure is not the same as actually experiencing group pressure. (p. 40)

Historical background

Co-operative learning, as Kutnick and Rogers (1994) point out, is not a new phenomenon:

> From the earliest recorded writings about education (certainly from Plato and Socrates) we see that learning takes place in a group context. This group context has, minimally, two elements vital to support the social process of learning – a number of individual pupils and a 'teacher' (one who has knowledge or information that others wish to obtain ... Socrates provided problem-solving tasks for his students and supported his learning context though 'dialogue' between expert (the knower) and novice. The dialogues also allowed the novices to generate and discuss ideas amongst themselves. The Socratic dialogue allows two types of learning dynamic, that appropriate answers may be confirmed by the expert and that mutually naive novices may speculate amongst themselves and thus generate new ideas to be tested. (p. 2)

In England during the late 1700s, Joseph Lancaster and Andrew Bell used co-operative learning groups extensively in their work, and the technique was subsequently introduced to America in 1806, when a Lancastrian school opened in New York City. In the last three decades of the nineteenth century, Colonel Francis Parker received widespread recognition for introducing the idea of co-operative learning into public schools. His success was founded on his ability to create a co-operative and democratic classroom atmosphere. During his period as Superintendent of Schools at Quincy, Massachusetts (1875–80), an average of 30,000 visitors a year examined his use of co-operative learning procedures (Johnson and Johnson, 1991).

Following Parker, John Dewey promoted the use of co-operative learning. He insisted that a child's experience must, from an early age, involve interaction with others to develop the character required for survival in the community. In the late 1930s, however, competition was emphasised in public schools (Pepitone, 1980). In the

1940s, Deutsch proposed a theory of co-operative and competitive situations that served as the foundation for subsequent research on co-operative learning. After a number of years, and following numerous research studies which provided evidence of the efficacy of co-operative learning, schools in America and Europe began to adopt and use co-operative learning strategies. Co-operative learning is thus one of the most thoroughly researched instructional methods (Johnson and Johnson, 1987b).

Theoretical rationale for co-operative learning

Co-operative learning can be justified in terms of established theories of children's learning. Bennett (1994) points out that an interest in children learning co-operatively in groups

> stems from various sources. These include a realisation among educators of the value of interpersonal processes in both learning and social relationships, an increasing awareness of the value of co-operation and problem-solving in the development of understanding and a desire to move away from instructional models which view teachers as the only source of knowledge and skills. (p. 51)

This point of view coincides with current theories of learning and development, especially the theories of Deutsch (1949), Piaget (1950) and Vygotsky (1978) that social interaction is an essential factor for enhancing children's learning. Bruner and Haste (1987) emphasise the importance of the social context for children's learning as follows:

> A quiet revolution has taken place in developmental psychology in the last decade. It is not only that we have begun to think again of the child as a *social being* – one who plays and talks with others, learns through interactions with parents and teachers – but because we have come once more to appreciate that through such social life, the child acquires a framework for interpreting experience, and learns how to negotiate meaning in a manner congruent with the requirements of the culture. 'Making sense' is a social process; it is an activity that is always situated within a cultural and historical context.
>
> Before that, we had fallen into the habit of thinking of the child as an 'active scientist', constructing hypotheses about the world, reflecting upon experience, interacting with the physical environment and formulating increasingly complex structures of thought. But this active, constructing child had been conceived as a rather isolated being, working alone at her problem-solving. Increasingly we see now that, given an appropriate, shared

> social context, the child seems more competent as an intelligent social operator than she is as a 'lone scientist' coping with a world of unknowns. (p. 1)

The developmental perspective in co-operative learning is based on the theories of Vygotsky (1978) and Piaget (1950). Vygotsky viewed much of children's learning as occurring through feedback derived from social interaction. He believed that social interaction is the key to learning how to think and learn; he also argued that social interaction improves a child's ability to gain and understand new knowledge. Moreover, he argued that what children can do today in co-operation they will tomorrow be able to do on their own (Wood, 1988). Piaget's theory agreed with Vygotsky's in regarding social interaction as a major factor in the development of skills and concepts. Piaget argued that the ability to see another's point of view, without losing one's own, is gradually acquired through repeated social interaction in which the child is exposed repeatedly to the viewpoints of others (Kamil and De Vries, 1988).

The motivational perspective on co-operative learning emphasises the reward or goal structure within which pupils in the group work. For example, Slavin (1993) argues that

> rewarding groups based on group performance (or the sum of individual performances) creates an interpersonal reward structure in which group members will give or withhold social reinforcers (e.g. praise, encouragement) in response to groupmates' task-related efforts. (p. 4)

The theory of co-operation, which was the foundation for co-operative team learning techniques, was first developed by Deutsch (1949). The two fundamental components of the theory are goal structure and reward structure. Deutsch described goal structure as occurring when students perceive their relationships with other students (in group settings) as interdependent. In other words, group members must depend on each other

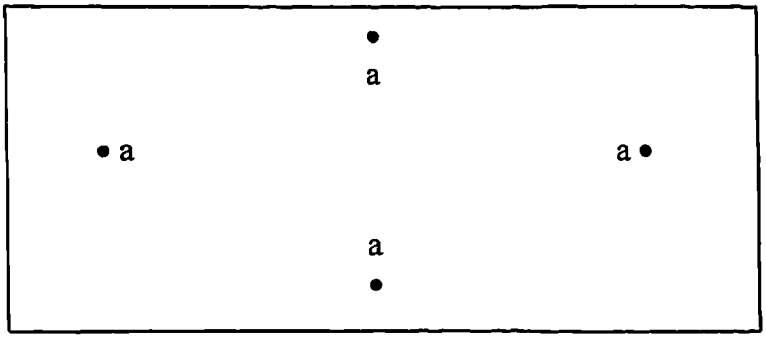
in order for the task to be completed. Deutsch hypothesised that perceived interdependence will result in group members working together more frequently, and with more co-ordination on their workload. The result of this division of work is a better atmosphere in which to work.

In Deutsch's theory of co-operation, the reward structure is one in which 'the whole' is rewarded rather than 'the part'. Reward for successfully completing a task is given to the entire group, not to individuals. This type of reward structure also affects the goal structure because it strengthens the perceived interdependence of the group members.

Types of co-operative groupwork

Dunne and Bennett (1990) suggest that certain types of class management and certain types of tasks differ in the way in which they promote co-operation among pupils. Moreover, they point out that co-operation increases when pupils are asked to work together for a joint product; co-operation is very important to realise the demands of the task. They offer three possible models for the different types of task, as follows:

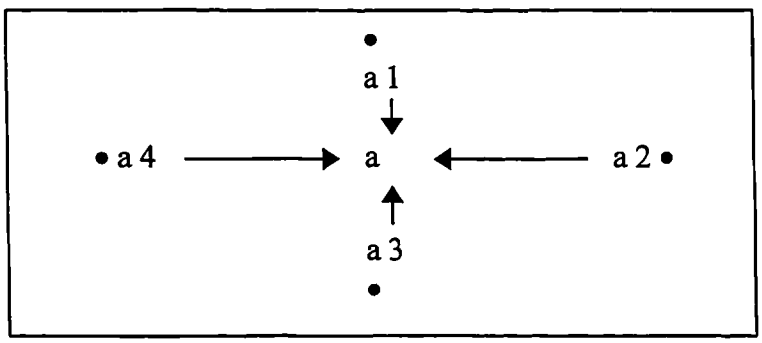
1. Working individually on identical tasks for individual outcomes. In this kind of task, children are engaged on the same task (a), but the aim is for an individual to produce an individual outcome (Figure 1). Bennett (1994) argues that the need for co-operation in this type of task structure is low. Dunne and Bennett (1990) maintain that it generates discussion of low quality, and children often seem confused about whether they are allowed to work together or not.



• = children
a = task

Figure 1 Children working individually on identical tasks for individual products (Source: Dunne and Bennett, 1990)

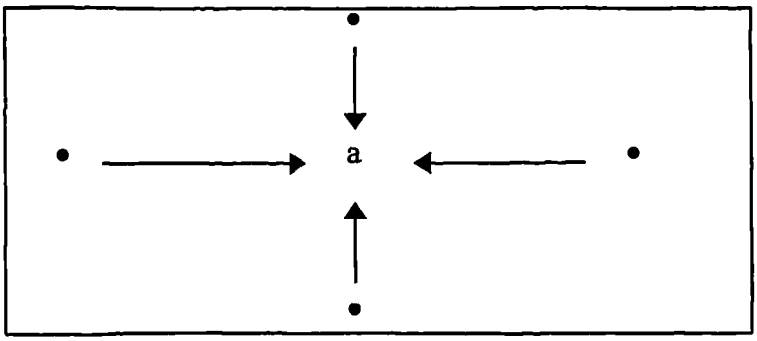
2. Working individually on 'jigsaw' elements for joint products. In this kind of structured task, the task is divided into as many elements as there are group members. Each member works on one element of the task (Figure 2). Bennett (1994) points out that in this kind of task structure the demand for co-operation and individual accountability is high, because everyone in the group is responsible for a part of the task.



• = children
a = task

Figure 2 Children working individually on jigsaw parts for joint product (Source: Dunne and Bennett, 1990)

3. Working jointly on one task for a joint product. In this kind of task structure, children work co-operatively to produce one product required of the group (Figure 3). Each group member's work has an impact on the group outcomes (Bennett, 1994).



• = children
a = task

Figure 3 Children working jointly on one task for joint outcome
(Source: Dunne and Bennett, 1990)

Co-operative learning strategies

There are a number of different co-operative learning strategies as well as variations among them. Each strategy falls into one of the three categories described above. Slavin (1989–90) suggests that variety is necessary because the strategies have different functions or domains of usefulness. Moreover, teachers have the opportunity to choose the type of instruction which best suits their classrooms. The co-operative strategies all provide different degrees and kinds of experience. However, the increasing number of techniques practised within co-operative learning brings disadvantages as well. They may confuse teachers, especially new starters, because these structures range from simple to highly-structured strategies each having its own distinct purpose, means of implementation and method of evaluation; this can cause confusion as regards which strategy is most appropriate in a given context. Moreover, becoming familiar with these strategies requires time, effort and money.

Table 1 presents some of the most recognised co-operative learning structures, with a brief description.

Table 1 Overview of selected co-operative learning methods

Structure	Brief description
Student Teams Achievement Division (STAD) (Slavin, 1978a, 1990)	Four-member learning teams (mixed in performance levels, sex and ethnicity); after the teacher presents a lesson, students work in teams and help each other to master the lesson. Students then take individual quizzes; team rewards are earned. Applicable to most grades and subjects; however, it is most appropriate for teaching well-defined objectives.
Team-Games-Tournament (TGT) (De Vries and Slavin, 1978)	Using the same teacher presentations and team work as in STAD, TGT replaces the quizzes with weekly tournaments in which students compete with members of the other teams with similar academic records. Low achievers compete with low achievers (a similar arrangement exists for high achievers). The winner of each tournament brings six points to his/her team. Team-mates help each other to master material; however, during competitions, helping others is not allowed. Applicable to most grades and subjects.
Team Assisted Individualisation (TAI) (Slavin *et al.* 1986)	Four-student learning teams (mixed ability groups as with STAD and TGT); TAI combines co-operative learning and individualised instruction and is applicable only to mathematics in grades three through six. Students take a placement test, then proceed at their own pace. Students help each other with problems. Without help, students take tests that are scored by student monitors. Each week the teacher evaluates and gives team rewards.
Group Investigation (Sharan and Sharan, 1989–90)	Groups are formed according to common interest in a topic. Students plan research, take individual tasks, summarise findings, and present the findings to their class.
Learning Together (Johnson and Johnson, 1987b, 1989–90)	Uses four- or five-member heterogeneous groups on assignment sheets. Each group hands in a single sheet, and receives rewards based on the group product. Learning together has five essential elements: positive interdependence; face-to-face interaction; individual accountability; social skills; group processing.
Co-operative Integrated Reading and Composition (CIRC) (Madden *et al.* 1986)	CIRC is designed to teach reading and writing in the upper elementary grades. Students are assigned to teams formed of pairs of students from different reading levels. Teacher works with one team, while other teams engage in cognitive activities: reading, predicting, summarising, and learning vocabulary. Groups follow a sequence of teacher instruction, team practice, team pre-assessments, and quizzes. Students are not given the quizzes until the team feels each student is ready. Team rewards are given.
Jigsaw (Aronson *et al.* 1978)	Uses six-member teams to work on academic materials that have been divided into sections. Each team member reads his/her section. The students of different teams who have studied the same sections meet to become experts. Students return to groups and teach other members about their sections. Students should listen carefully to their team-mates to learn about other sections.

Jigsaw II (Slavin, 1987)	Students work in four- or five-member teams. Students read a common academic material. Students also receive a topic on which to become expert. Members with the same topics meet together as in Jigsaw to become expert, and then they return to their groups to teach about their parts. Students take individual quizzes; teachers produce team scores based on each student's test performance.
Co-op Co-op (Kagan, 1989–90)	Co-op Co-op consists of a 10-step structure in which students in groups produce a project to share with the whole class. Each student has his/her part of the mini-topic and makes a contribution toward the class project.
Small-Group Mathematics (Davidson, 1980)	Students are divided into groups of four; in forming groups teacher considers students' choices of who they prefer to work with. Students work to achieve a group solution for each problem, share leadership, listen carefully to other members, and contribute to the ideas of others. The teacher may use test and quizzes, group projects, homework, and self- and peer-evaluation.

Note: The co-operative structures summarised appear in condensed format and further reading is required to provide a more detailed picture.
Source: Adapted from Manning and Lucking, 1991 and Kagan 1989–90.

Outcomes of co-operative learning

Co-operative learning in the United States

The evidence provided by US studies about the role of co-operative learning in improving pupil performance and social skills is overwhelming. Johnson *et al.* (1986), for example, made the following claims after conducting more than 25 studies and reviewing a large body of research into co-operative learning:

> Achievement will be higher when learning situations are structured co-operatively rather than competitively or individualistically. Co-operative learning experiences, furthermore, promote greater competencies in critical thinking, more positive attitudes toward the subject areas studied, greater psychological health, and greater perceptions of the grading system as being fair. (p. 29)

Similarly, Slavin (1989–90) supports the positive impact of co-operative learning on achievement, arguing that

> after nearly two decades of research and scores of studies, a considerable degree of consensus has emerged. There is agreement that – at least in elementary and middle/junior high schools and with basic skills objectives – co-operative methods that incorporate group goals and individual accountability accelerate student learning considerably ... Research must continue to test the limit of co-operative learning ... Yet

> what we know is more than enough to justify expanded use of co-operative learning as a routine and central feature of instruction. (p. 54)

The US studies have tended to focus on evaluating the superiority of one technique against the other in terms of achievement gains and social development, and on examining the effectiveness of co-operative learning on pupils of different backgrounds, races, educational levels, ages and genders, and pupils studying different subject matters (Newmann and Thompson, 1987; Johnson and Johnson, 1981).

Co-operative learning in the United Kingdom

The current use of co-operative learning in the United Kingdom is often linked with the publication of the Plowden Report (1967). Kerry and Sands (1982) uphold the benefits of classroom groups as recommended by the Plowden Report. They maintain that working in groups increases pupils' ability to co-operate, that pupils will be able to learn from each other, and that these groupings will eliminate the fear of failure.

Co-operative learning in the Middle East

There is only a relatively small body of research relating to the use and effectiveness of co-operative learning in schools in the Middle East, though some studies have been conducted in Kuwait, Jordan and Bahrain. The results reported by most of these studies reflect the superior performance of pupils engaged in co-operative learning compared with those taught in traditional classrooms (Nouh, 1993).

Handout 4 Planning Your Lesson

Now you have some background about co-operative learning groups and how they work, you need to learn how to plan for groupwork at your grade level or in your subject area.

Read the explanation for each step of the model lesson plan, read the examples which are offered, and consider the suggestions provided.

Step 1

There are four parts to Step 1. These are as follows:

Step 1A: preliminary information

Record the following information:

Subject matter:
Topic title:
Grade level:

Step 1B: summary of the lesson

Summarise the lesson that you are going to teach by identifying the main themes in your lesson.

Summary of the lesson:

Step 1C: instructional objectives

Identify the objectives of your lessons. Make your statements as clear as possible.

Instructional objectives:

A To memorise

B To practise
C To observe
D To identify

Step 1D: materials and time required

Determine the type and quantity of the materials and the time you need to conduct your lesson.

Item	Number needed

Time required:

Step 2

Step 2A: deciding on the size of the group

Decide which size of learning group is most favourable. Co-operative learning groups tend to range in size from two to six.

Group size: 2, 3, 4, 5, 6

Step 2B: assignment to groups

In general, there are three ways of assigning pupils to groups:

1. Placing pupils of different abilities in learning groups: that is, placing high-, medium- and low-ability pupils within the same learning group.

2. Placing pupils randomly into learning groups.

3. Allowing pupils to select who they want to work with (friendship groups).

Assignment to groups: ability, random, friendship.

Step 2C: assigning roles to pupils

Assign different roles to pupils to ensure interdependence. For example:

Manager:	gets any materials needed by the group, keeps track of them, then hands them in to the teacher.
Reader:	reads the groups' material out loud to the group as clearly as possible so that the group members can hear and understand.
Recorder:	writes the best answers of the group on the worksheet, gets the group members to sign the worksheet, and then hands it in to the teacher.
Encourager:	observes to make sure that everyone is participating, and encourages silent members to contribute.
Communicator:	represents orally the groupwork to the teacher and to other groups.
Checker:	checks on the learning of group members by asking them to discuss, explain or summarise materials learned.

Step 3

Step 3A: instructional task

Look back at your instructional objectives and write a task statement, which specifically describes what pupils are to do in their co-operative groups. Divide the task into manageable steps if there are several parts.

Step 3B: positive interdependence

Be sure to communicate to pupils that they have a group goal, and that the work is not to be done individually or competitively, but co-operatively. Teachers can do this in several ways. Here are some ways of ensuring positive interdependence:

1. One pencil, worksheet or book is given to a group.
2. One worksheet is written from a group.
3. The task is divided into parts which cannot be finished unless all help.
4. One paper is passed round the group. Each pupil must do a part.
5. Jigsaw materials: each pupil learns a part and then teaches it to the group.
6. There is a reward if every member in the group succeeds.

Step 3C: individual accountability

Accountability refers to the ways in which you check on task accomplishment, the learning of each member of the group, and the level of pupil performance. Teachers can ensure accountability by using the following suggestions:

1. Pupils do the work first to bring to the group.

2. Pick one pupil at random to give oral answers to the questions studied by the group.

3. Every member in the group writes, then certifies the correctness of all papers. You pick one to grade.

Step 3D: expected behaviour

Specify the behaviours that are appropriate and desirable within the learning groups in your classroom. The expected behaviours may include the following:

1. Contribute to the group and help the other group members.

2. Listen to others with attention.

3. Encourage every member in your group to participate.

4. Praise helpful behaviour or ideas.

5. Ask for help if you need it.

6. Check to make sure every member in your group understands.

7. Work efficiently and quietly.

Step 4

Monitoring is one of the main roles carried out by teachers in co-operative learning situations. Teachers should spend much of their time in the classroom observing group members in order to see what problems they are facing in completing the assigned task and in working co-operatively. The following are suggestions for effective monitoring:

1. Give direct feedback and reinforcement for learning.

2. Encourage oral discussion and explanation.

3. Reteach ambiguous concepts or points.

4. Determine what group skills pupils have mastered.

5. Provide assistance when it is needed.

Step 5

Step 5A: criteria for success

Establish the criteria on which the pupils will be evaluated at the end of the lesson.

By the end of the lesson each group should:

_____

_____

_____

_____

Appendix 13

Achievement Test for Sixth-Grade Science

School's name:

Pupil's name:

Grade:

Achievement Test for Sixth-Grade Science

Instruction

Read the following questions carefully. Answer all the questions in this test.

1. What are the methods of plant propagation?

   A.
   B.

2. What are the methods of seed dispersal?

   A.
   B.
   C.
   D.

3. Explain in detail one of the seed dispersal methods.

4. Name the places in which water plants live.

   A.
   B.

5. For the following statements, mark (√) if the statement is true and mark (x) if the statement is false.

   A. All water plants have roots, stems and leaves. ( )

   B. Some water plants live covered by the water. ( )

   C. Water plants' stems bend easily to resist the flowing of the water. ( )

   D. Water plants which live under the water breathe the oxygen which is dissolved in the water. ( )

   E. Water plants obtain the water they require via all their parts. ( )

6. By drawing and writing in stages, illustrate a palm's method of vegetative propagation.

7. By drawing and writing in stages, illustrate the method for vegetatively planting a shade plant.

8. By drawing and writing in stages, illustrate the method for germinating broad beans.

9. What are the methods for vegetatively propagating plants?

A.
B.

Appendix 14

Content and Structure of the Lessons

The content of the lessons was curriculum-based. The following steps were taken when preparing the lesson plans:

1. Development of basic lesson planning format.
2. Writing up lesson plans.
3. Obtaining materials and resources needed.

Johnson *et al.* (1987) state that there are five major sets of strategies which should be taken into account when a teacher plans co-operative learning lessons. These are as follows:

1. Clearly specifying the objectives for the lesson.
2. Making decisions about placing students in learning groups before the lesson is taught.
3. Clearly explaining the task, goal structure and learning activity to the students.
4. Monitoring the effectiveness of the co-operative learning groups and intervening to provide task assistance (such as answering questions and teaching task skills) or to increase students' interpersonal and group skills.
5. Evaluating pupils' achievement and helping pupils discuss how well they collaborated with each other. (p. 14)

All the above elements were discussed in detail with teachers in the training programme and teachers were trained to develop lesson plans which took into account all the above items. Therefore the teachers agreed on the following format to develop lesson plans:

Subject matter	specifies the subject matter to be taught.
Topic title	states the title of the topic to be taught.
Grade level	specifies the grade level to which the topics should be taught.
Group size	determines the size of groups.

Assignment to groups	determines how groups are formed.
Roles	specifies roles for pupils in groups.
Lesson summary	summarises the major elements of the lesson.
Instructional objectives	specifies academic objectives to be achieved by the end of the lesson and the collaborative skills and objectives to be emphasised during the lesson.
Materials	determines the materials to be used during the lesson in terms of item and number needed.
Time required	determines the time required to implement the lesson.
Instructional task	specifies the tasks groups will be engaged in during the lesson.
Positive interdependence	structures the lesson to promote positive interdependence among pupils.
Individual accountability	implements procedures to ensure that all members in groups have learned the materials assigned.
Criteria for success	explains criteria by which pupils' work will be evaluated.
Expected behaviour	specifies the behaviour that is appropriate and desirable within the learning groups.

Teachers' roles

1. Monitoring and intervening: how pupils will be observed and helped during groupwork activities.

2. Evaluation: specifies groups' products to be evaluated by a criterion-referenced system.

Teachers developed lesson plans for themselves to follow, and direction sheets for each lesson to be followed by pupils. The following are the lesson plans for the topics taught during the implementation of co-operative learning.

Lesson 1: Pupils' instruction sheet

Topic title: Propagation of plants

You are going to watch an educational film about the propagation of plants, and you will be required to:

1. Answer the following questions individually:
   a. What are the methods of propagating plants?
   b. What are the methods of vegetative propagation?
   c. What are the steps in propagating plants from stem and cuttings?

2. Work in a group to arrive at the best possible answers to the above questions.

3. In groups, use the available resources to propagate the potato, mint and shade plants.

4. On the worksheet each group should write and illustrate the method of propagating the date-palms from cuttings.

Expected behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Lesson 1: Teacher's notes

Subject matter: Science
Topic title: Propagation of plants
Grade level: Sixth grade

Summary of the lesson

There are two methods of plant propagation:

1. By seeds
2. By vegetative propagation

Some plants are propagated by cutting part of the plant such as one of the leaves or part of the stems and planting in the soil. This method is called 'vegetative propagation'.

Instructional objectives

1. Pupils will learn the methods of plant propagation.
2. Pupils will grow a shade plant, a potato plant and a mint plant.
3. Pupils will learn how to propagate date-palms using vegetative propagation.

Materials

Item	Number needed
Cup	6
Fertiliser	¼ bag
Mint	1 coil
Potato	6 potatoes
Shade plant	1 herb
Educational film	1
Spoons, knives, scissors	6 each
Answer sheet	6 sheets

Time required: 40 minutes

Decisions

Group size:	2, 3, 4, 5, 6, 7
Assignment to groups:	Random, friendship, ability (every teacher should select the pattern of group assignment)

Pupils' roles

Manager:	gets any materials needed by the group, keeps track of them, then hands them in to the teacher.
Reader:	reads the group's material out loud to the group as clearly as possible, so that the group members can hear and understand.
Recorder:	writes the best answers of the group on the worksheet, gets the group members to sign the worksheet, then hands it in to the teacher.
Encourager:	observes to make sure that everyone is participating, and encourages silent members to contribute.
Communicator:	represents orally the groupwork to the teacher and other groups.
Checker:	Checks on the learning of group members by asking them to discuss, explain or summarise materials learned.

Instructional Task

You are going to watch an educational film on the propagation of plants. When the film is finished everyone should answer the following questions by themselves:

1. What are the methods for propagating plants?
2. What are the methods of vegetatively propagating plants?
3. How can you propagate date-palms and a shade plant using vegetative propagation?

Then spend a few minutes discussing and summarising the answers for the above question together; each of you is responsible for helping the group arrive at a good answer for the questions. Then, each group should propagate three plants, potato, shade plant and mint, and illustrate the propagation procedures for them. Finally, by drawing and illustration each group should explain the method of propagating the date-palms from cuttings.

Positive Interdependence

Some ways of ensuring positive interdependence:

1. One pencil, worksheet or book is given to a group.
2. One worksheet is written from a group.
3. The task is divided into parts which cannot be finished unless all help.
4. One paper is passed round the group. Each pupil must do a part.
5. Jigsaw materials: each pupil learns a part and then teaches it to the group.
6. There is a reward if every member in the group succeeds.

Individual Accountability

1. Pupils do the work first to bring to the group.
2. Pick one pupil at random to orally answer questions studied by the group.
3. Every member in the group writes, then certifies the correctness of all the papers; you pick one to grade.
4. Listen and observe as pupils take turns orally rehearsing information.
5. Assign roles to each pupil.
6. Pupils get a bonus if all group members do well individually.

Criteria for Success

By the end of the lesson each group should hand in a worksheet with the best possible answers to the given questions. Each group should also hand in the three propagated plants with illustration of the procedures which have been followed.

Expected Behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Monitoring and Processing

Suggestions for things to do when monitoring:

1. Give direct feedback and reinforcement for learning.
2. Encourage oral discussion and explanation.
3. Reteach ambiguous concepts or points.
4. Determine what group skills pupils have mastered.
5. Provide assistance when it is needed.

Assessment

Groups' worksheets will be graded and the points for each group will be posted on the board.

Lesson 2: Pupils' instruction sheet

Topic title: Seed dispersal

You are going to watch an educational film about seed dispersal, and you are required to:

1. Find out the answers to the following questions individually:
   a. What are the methods of seed dispersal?
   b. How can you explain the role of the wind in seed transport?
   c. How can you explain the role of animals in seed dispersal?
   d. How can you explain the role of running water in seed transport?

2. Work with your group to come up with one good answer to the above questions.

3. Each group will present its findings to the other groups and to the teacher.

Expected behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Lesson 2: Teacher's notes

Subject matter: Science
Topic title: Seed Dispersal
Grade level: Sixth grade

Summary of the lesson

There are many methods of seed dispersal, via which seeds transfer from one place to another. The wind, running water and animals are the major means of seed dispersal.

Instructional objectives

1. Pupils will learn the methods of seed dispersal.
2. Pupils will learn the role of wind, animals and running water in seed dispersal.

Materials

Item	Number Needed
Textbook	1 for each group
Educational film	1
Worksheet	10

Time required: 40 minutes

Decisions

Group size:	2, 3, 4, 5, 6, 7
Assignment to groups:	Random, friendship, ability (every teacher should select the pattern of group assignment)
Pupils' roles:	Manager, Reader, Recorder, Encourager, Communicator, Checker

Instructional Task

You are going to watch an educational film on seed dispersal. When the film is finished everyone should answer the following individually:

1. What are the methods of seed dispersal?
2. Explain each method with illustration.

Then spend a few minutes discussing your answers with your group. The Recorder in the group should write the best possible answer to the given questions. Each pupil is responsible for helping the group arrive at a good answer to the questions.

Positive Interdependence

Some ways of ensuring positive interdependence:

1. One pencil, worksheet or book is given to a group.
2. One worksheet is written from a group.
3. The task is divided into parts which cannot be finished unless all help.
4. One paper is passed round the group. Each pupil must do a part.
5. Jigsaw materials: each pupil learns a part and then teaches it to the group.
6. There is a reward if every member in the group succeeds.

Individual Accountability

1. Pupils do the work first to bring to the group.
2. Pick one pupil at random to give oral answers to the questions studied by the group.
3. Every member in the group writes, then certifies the correctness of all the papers. You pick one to grade.
4. Listen and observe as pupils take turns orally rehearsing information.
5. Assign roles to each pupil.
6. Pupils get a bonus if all group members do well individually.

Criteria for Success

By the end of the lesson each group should hand in a worksheet with the best possible answers to the given questions. Everyone in the group should also be able to present the concepts of the lesson and to explain the answers given by his group to the questions.

Expected Behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.

5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Monitoring and Processing

Suggestions for things to do when monitoring:

1. Give direct feedback and reinforcement for learning.
2. Encourage oral discussion and explanation.
3. Reteach ambiguous concepts or points.
4. Determine what group skills pupils have mastered.
5. Provide assistance when it is needed.

Evaluation

Groups' worksheets will be graded and the points for each group will be posted on the board.

Lesson 3: Pupils' instruction sheet

Topic title: Seed components

1. Using the seeds available to you and the textbook, study with your group the seed components of the bean plant. Each group should then draw the seed with its components and label the drawing.

2. Each group should germinate the bean, lentil and barley seeds and write the procedures of the germination.

3. Each group should be ready to present its findings and work to other groups and the teacher.

Expected behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Lesson 3: Teacher's notes

Subject Matter:	Science
Topic Title:	Seed components
Grade level:	Sixth grade

Summary of the lesson

Acquainting pupils with the seed components of the bean plant and the methods of germinating the seeds of some plants such as chickpeas, corn, lentils, barley and broad beans.

Instructional Objectives

1. Pupils will learn the components of bean seeds.
2. Pupils will germinate the broad bean, lentil and barley seeds.
3. Pupils will draw a bean seed and write the relevant clarifications.

Materials

Item	Number Needed
Bean, lentil and barley seed containers	10
Cotton coil	1
Knives	10
Plates	10
Worksheets	10

Time required: 40 minutes

Decisions

Group size:	2, 3, 4, 5, 6, 7
Assignment to groups:	Random, friendship, ability (every teacher should select the pattern of group assignment)
Pupils' roles:	Manager, Reader, Recorder, Encourager, Communicator, Checker

Instructional Task

Each group will be given a bean seed to observe and should be asked to describe its components. Then, each group should draw the bean seed and label the drawing with

relevant information. Finally, each group should germinate the following seeds, bean, lentil and barley, and write the germinating procedures followed.

Note: Groups may use the textbook to check their answers and drawings.

Positive Interdependence

Some ways of ensuring positive interdependence:

1. One pencil, worksheet or book is given to a group.
2. One worksheet is written from a group.
3. The task is divided into parts which cannot be finished unless all help.
4. One paper is passed round the group. Each pupil must do a part.
5. Jigsaw materials: each pupil learns a part and then teaches it to the group.
6. There is a reward if every member in the group succeeds.

Individual Accountability

1. Pupils do the work first to bring to the group.
2. Pick one pupil at random to give oral answers to the questions studied by the group.
3. Every member in the group writes, then certifies the correctness of all the papers. You pick one to grade.
4. Listen and observe as pupils take turns orally rehearsing information.
5. Assign roles to each pupil.
6. Pupils get a bonus if all group members do well individually.

Criteria for Success

By the end of the lesson each group should hand in a worksheet which contains the description of the bean seed components and the procedures for germinating the beans, lentils and barley seeds.

Expected Behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.

5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Monitoring and Processing

Suggestions for things to do when monitoring:

1. Give direct feedback and reinforcement for learning.
2. Encourage oral discussion and explanation.
3. Reteach ambiguous concepts or points.
4. Determine what group skills pupils have mastered.
5. Provide assistance when it is needed.

Evaluation

Groups' worksheets will be graded and the points for each group will be posted on the board.

Lesson 4: Pupils' instruction sheet

Topic title: Water plants

Using the textbook and water plants available, each group is going to:

1. Discover the places in which water plants live.
2. Find out the types of water plants.
3. Describe the water plants in terms of their leaves and stems.
4. Write all answers on the worksheet and be ready to present them.

Expected behaviour

1. Contribute to the group and help the other group members.
2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Lesson 4: Teacher's notes

Subject matter: Science
Topic title: Water Plants
Grade level: Sixth grade

Summary of the lesson

Acquainting pupils with the places in which water plants live, their types and some of their attributes.

Instructional Objectives

1. Pupils will learn the places in which water plants live
2. Pupils will learn the types of water plants
3. Pupils will learn the attributes of water plants in terms of:
   (a) whether they are covered by water or not;
   (b) stem adaptation;
   (c) respiration;
   (d) leaf shape.

Materials

Item	Number needed
Textbook	1 for each group
Water plants	3 different types of waterplants for each group
Worksheet	1 for each group

Time required: 40 minutes

Decisions

Group size:	2, 3, 4, 5, 6, 7
Assignment to groups:	Random, friendship, ability (every teacher should select the pattern of group assignment)
Pupil's roles:	Manager, Reader, Recorder, Encourager, Communicator, Checker

Instructional Task

You are going to read from your textbook (pp. 180, 182, 183) to find out the places in which water plants live, the types of water plants, and the attributes of water plants in terms of stem adaptation, covering by water, respiration and leaf shape. Each group should write its answers on the worksheet and be ready to discuss the answers with other groups and the teacher.

Each group will be given three types of water plant to observe and to describe in terms of stems and leaves on the worksheet.

Positive Interdependence

Some ways of ensuring positive interdependence:

1. One pencil, worksheet or book is given to a group.
2. One worksheet is written from a group.
3. The task is divided into parts which cannot be finished unless all help.
4. One paper is passed round the group. Each pupil must do a part.
5. Jigsaw materials: each pupil learns a part and then teaches it to the group.
6. There is a reward if every member in the group succeeds.

Individual Accountability

1. Pupils do the work first to bring to the group.
2. Pick one pupil at random to give oral answers to the questions studied by the group.
3. Every member in the group writes, then certifies the correctness of all papers. You pick one to grade.
4. Listen and observe as pupils take turns orally rehearsing information.
5. Assign roles to each pupil.
6. Pupils get bonus if all group members do well individually.

Criteria for Success

Each group should hand in the answers to the given questions along with a description of the given water plants.

Expected Behaviour

1. Contribute to the group and help the other group members.

2. Listen to others with attention.
3. Encourage every member in your group to participate.
4. Praise helpful behaviours or ideas.
5. Ask for help if you need it.
6. Check to make sure every member in your group understands.
7. Work efficiently and quietly.

Monitoring and Processing

Suggestions for things to do when monitoring:

1. Give direct feedback and reinforcement for learning.
2. Encourage oral discussion and explanation.
3. Reteach ambiguous concepts or points.
4. Determine what group skills pupils have mastered.
5. Provide assistance when it is needed.

Evaluation

Groups' worksheets will be graded and the points for each group will be posted on the board.